United States Court of Appeals
for the
District of Columbia Circuit

TRANSCRIPT OF RECORD

340

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United States Court of Appeals for the District of Columbia

APRIL TERM, 1936.

No. 6784

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PAUL KOLLSMAN, APPELLANT,

vs.

CONWAY P. COE, COMMISSIONER OF PATENTS.

APPEAL FROM THE DISTRICT COURT OF THE UNITED STATES
FOR THE DISTRICT OF COLUMBIA.

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FILED JULY 15, 1936.
PRINTED SEPTEMBER 11, 1936.

THE ASSOCIATION OF THE BAR
OF THE CITY OF NEW YORK

United States Court of Appeals for the District of Columbia

APRIL TERM, 1936

No. 6784

PAUL KOLLSMAN, APPELLANT,

vs.

CONWAY P. COE, COMMISSIONER OF PATENTS,
APPELLEE.

APPEAL FROM THE DISTRICT COURT OF THE UNITED STATES
FOR THE DISTRICT OF COLUMBIA.

INDEX.

	Original	Print
Caption	a	1
Bill for Letters Patent	1	1
Answer to the bill of complaint	7	7
Memorandum of court	9	9
Final decree	9	10
Appeal noted by plaintiff from certain portions of decree; undertaking to act as a cost bond fixed in the sum of $100. with leave to deposit $50. cash in lieu thereof	10	10
Memorandum: $50 deposit in lieu of bond on appeal	11	11
Order extending time to file Designation of Record	11	11
Findings of fact	11	11
Conclusions of law	13	13
Assignment of error	15	13
Order making statement of evidence part of record	17	15
Order of Court of Appeals in re: Exhibits	18	16
Designation of record	19	17

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	Original	Print
Clerk's certificate	20	17
Stipulation re physical exhibits and statement of evidence	21	18
Testimony of Paul Kollsman	25	23
Testimony of Walter Angst	27	23
Testimony of Charles S. Jones	28	24
Plaintiff's exhibit 1	31	26
Defendant's exhibit 1	100	68
Order re exhibits	147	108

United States Court of Appeals for the District of Columbia

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a District Court of the United States for the District of Columbia.

No. 58618 In Equity

Paul Kollsman, *Plaintiff,*

vs.

Conway P. Coe, Commissioner of Patents, *Defendant.*

United States of America,
District of Columbia, ss:

BE IT REMEMBERED, That in the District Court of the United States for the District of Columbia, at the City of Washington, in said District, at the times hereinafter mentioned, the following papers were filed and proceedings had, in the above-entitled cause, to wit:—

1 *Bill for Letters Patent.*

Filed April 16 1935

In the Supreme Court of the District of Columbia

In Equity No. 58618

Action under Section 4915 U. S. Revised Statutes.

Paul Kollsman, *Plaintiff*

against

Conway P. Coe, Commissioner of Patents, *Defendant.*

The Plaintiff states as follows:

1. The Plaintiff, Paul Kollsman, is a citizen of the United States and a resident of the Borough of Manhattan, County, City and State of New York, and brings this suit in his own right.

2. The Defendant, Conway P. Coe, is the Commissioner of Patents of the United States, a legal resident of the

District of Columbia and is sued as Commissioner of Patents of the United States.

3. This bill is filed in accordance with the provisions of the Federal Laws of the United States of America and as set forth under Revised Statute 4915.

4. The Plaintiff, Paul Kollsman, filed an application for a patent in the United States Patent Office entitled "Indicator" on December 10, 1931, which was given Serial No. 580,119 and which eventuated in the grant of Letters Patent No. 1,857,311 to the said Paul Kollsman on May 10, 1932; that Letters Patent No. 1,857,311 were inoperative by reason of a defective or insufficient specification; that errors which rendered such patent so inoperative arose through inadvertence, accident or mistake and without any fraudulent or deceptive intention; that said Paul Kollsman, Plaintiff herein, without any unreasonable or unavoidable delay,
surrendered said Letters Patent No. 1,857,311 to the
2 Commissioner of Patents and on the 27th day of October, 1932 applied in due form of law for a reissue thereof upon a corrected specification filed with said application; that said reissue application filed on the 27th day of October, 1932 was given Serial No. 639,897; that it came to the attention of your Plaintiff, Paul Kollsman, that more than one reissue patent was necessary, there being properly divisible subject matter set forth in the aforesaid reissue application Serial No. 639,897; wherefore the said Plaintiff, Paul Kollsman, did on the 8th day of January, 1934 file a divisional application of his aforesaid reissue application Serial No. 639,897, entitled "Quick Reading Indicator"; that this divisional application was given Serial No. 705,642 and is the application evidencing the subject matter of this bill.

5. The said divisional application Serial No. 705,642 was filed in accordance with the laws of the United States and the Rules of the Patent Office.

6. The said divisional application Serial No. 705,642 has been duly prosecuted in accordance with the laws of the United States and the Rules of the Patent Office.

7. The said divisional application Serial No. 705,642 has been passed upon by the Primary Examiner who refused to allow the following claims, which he finally rejected in accordance with the Rules of the Patent Office:

1. An aircraft measuring instrument comprising a yielding element operated by a varying force, the intensities of which are to be measured; two dissimilar pointers concentrically rotatable and constrained to rotate in the ratio of ten to one; a single scale graduated in the decimal system and cooperatively concentric with said pointers for the purpose of indicating the said intensities of said varying force; and mechanism operatively connecting both said pointers with said yielding element operatively to rotate said pointers both in the same direction in the ratio of ten to one and in proportion to changes in said varying force.

2. An aircraft measuring instrument comprising a yielding element operated by a varying force, the intensi-
3 ties of which are to be measured; a dial having a circularly arranged scale; two dissimilar pointers pivoted concentric with said scale, intergeared to rotate in the predetermined ratio of ten to one and cooperating solely with said scale for purposes of indicating the said intensities of said varying force in the decimal system; and mechanism operatively connecting both said pointers with said yielding element operatively to rotate said pointers both in the same direction in said predetermined ratio of rotation and in predetermined accordance with changes in said varying force.

3. An aeroplane measuring instrument having a casing; a dial for said casing having a marginal circular scale having ten major digits uniformly angularly positioned; a plurality of pointers movable in the ratio of one to ten in concentric cooperation with said scale; and means for rotating said pointers in the said one to ten ratio in response to something to be measured and indicated whereby quick readings in a plurality of digits in the decimal system may be made without calculation.

4. An aeroplane measuring instrument having a casing; a dial for said casing having a marginal circular scale having ten major digits uniformly angularly positioned; a plurality of pointers movable in the ratio of one to ten in concentric cooperation with said scale; means for rotating said pointers in the said one to ten ratio in response to something to be measured and indicated whereby quick readings in a plurality of digits in the decimal system may

be made without calculation; and manual means for relatively setting said pointers and said scale.

5. An aircraft measuring and indicating instrument comprising a yielding element operated by an external varying condition to be measured and indicated; a plurality of dissimilar pointers concentrically rotatable and constrained to rotate in the ratio of ten to one; a dial having a single scale graduated in the decimal system and cooperatively concentric with said pointers for the purpose of indicating the movements of said yielding element; mechanism operatively connecting said pointers with said yielding element operatively to rotate said pointers in the same direction in the ratio of ten to one and in response to changes in said yielding element; and an enclosing casing operatively housing all the parts for operation regardless of the direction of the force of gravity.

6. An aircraft measuring and indicating instrument comprising a yielding element operated by an external varying condition to be measured and indicated; a plurality of dissimilar pointers concentrically rotatable and constrained to rotate in the ratio of ten to one, one of which is counterbalanced; a dial having a single scale graduated in the decimal system and cooperatively concentric with said pointers for the purpose of indicating the movements of said yielding element; mechanism operatively connecting said pointers with said yielding element operatively to rotate said pointers in the same direction in the ratio of ten to one and in response to changes in said yielding element; and an enclosing casing operatively housing all the parts for operation regardless of the direction of the force of gravity, and exposing said pointers and said scale for clear visibility.

7. An altimeter having a scale, an indicator, a
4 plurality of pointers movable in the ratio of one to
ten by the indicator, said pointers being coordinated
with said scale, and the indicator and scale being rotatable relatively to each other.

8. The applicant, Paul Kollsman, Plaintiff herein, appealed from the decision of the Primary Examiner to the Board of Appeals, which Board affirmed the rejection of the Primary Examiner in its decision dated September 20, 1934.

9. The Commissioner of Patents by the Board of Appeals contends that the applicant's claims do not define subject matter patentable over the art and in view of the following references cited during the prosecution of the application in the Patent Office:

Eremeeff,	1,676,983
Rasch (French)	475,931

10. The Commissioner of Patents by the Board of Appeals further contends that claim 1 as follows is representative of the subject matter involved:

"1. An aircraft measuring instrument comprising a yielding element operated by a varying force, the intensities of which are to be measured; two dissimilar pointers concentrically rotatable and constrained to rotate in the ratio of ten to one; a single scale graduated in the decimal system and cooperatively concentric with said pointers for the purpose of indicating the said intensities of said varying force; and mechanism operatively connecting both said pointers with said yielding element operatively to rotate said pointers both in the same direction in the ratio of ten to one and in proportion to changes in said varying force."
and further contends,

"The patent to Eremeeff discloses a similar instrument in which the pointers travel at a ratio of 1:4. The French patent shows a gas measuring instrument in which pointers travel at the 1:10 ratio. In this patent scales are provided for each pointer.

"We are convinced that it would not involve invention to employ a single scale for all of the pointers in the French patent and we also believe that it would be obvious to employ the 1:10 ratio in the Eremeeff instrument. If
5 any suggestion was necessary in modifying the letter
instrument, we consider that the disclosure of the French patent is pertinent even though the measuring instrument of that patent is not intended to be used for measuring a varying force on an airplane."

11. The applicant, Paul Kollsman, the Plaintiff herein, disagrees with these contentions of the Commissioner of Patents mentioned in paragraphs 9 and 10 of this bill and contends that the references of record do not anticipate his invention; that the dial and pointers of the Eremeeff pat-

ent require a laborious mental calculation for an airplane pilot often too lengthy for safety; that this Eremeeff patent is not the full equivalent of the combination claimed by the applicant; that the gas meter of the French patent to Rasch is limited to one scale for each pointer and cannot readily be read instantaneously in the decimal system and further teaches nothing in the airplane instrument art, itself being in a non-analogous art, that of measuring the flow of gas in dwellings; that many of the claims contain elements in addition to those exemplified by claim 1; that the claims involve more than that disclosed in either the patent to Eremeeff or the French patent to Rasch, or any aggregation thereof; and that the invention set forth in the claims was not obvious and was the result of an exercising of the inventive faculties—a true creative effort not within the province of a skilled mechanic in the art.

12. The Plaintiff further states that the said invention is new and useful, has gone into extensive commercial use to the number of tens of thousands of embodiments as the result of the efforts of this plaintiff and was not known or used by others in this country before his invention thereof and not patented or described in any printed publication in this or in any foreign country before his invention thereof or more than two years prior to his original appli-
6 cation for patent therefor, and not in public use or
on sale in this country for more than two years prior to said original application and not patented in any foreign country by him or his legal representatives on an application filed more than twelve months prior to said original application for U. S. Letters Patent and has not been abandoned.

WHEREFORE, the Plaintiff prays that the Honorable Court decree that the Commissioner of Patents be directed to allow the said claims and such other claims as upon hearing the Court may find patentable.

PAUL KOLLSMAN

LEONARD DAY
Solicitor for Plaintiff

STATE OF NEW YORK,
County of Kings, ss:

Paul Kollsman, being duly sworn, deposes and says that he is the Plaintiff mentioned in the foregoing Bill; that he has read the same and knows the contents thereof; that the same is true to his own knowledge, except as to the matters therein stated to be alleged on information and belief and as to those matters he believes it to be true.

PAUL KOLLSMAN

Sworn and subscribed to before me this 11 day of April, 1935.

JAMES BOSLET

(SEAL) Notary Public, Queens Co. No. 125, Reg. No. 5182. Cert. Filed in Kings. Co. No. 39, Reg. No. 7203. Commission Expires March 30, 1937.

7 *Answer to the Bill of Complaint.*

Filed April 30 1935

* * * * * * * *

To the Honorable
The Judges of the Supreme Court
of the District of Columbia.

Conway P. Coe, Commissioner of Patents, defendant herein, in answer to the Bill of Complaint alleges on information and belief as follows:

1. He admits for the purpose of this suit the allegations as to the citizenship and residence of the plaintiff.

2. He admits that he is Commissioner of Patents and that his legal residence is in the State of Maryland, his official residence being in the District of Columbia.

3. He admits the allegation of jurisdiction under Section 4915 R. S.; 35 U. S. C. A. 63, as amended.

4. He admits the filing by plaintiff of an application for patent, the issuance of a patent on said application, the subsequent surrender of said patent to the Commissioner, the filing of an application for a reissue of said patent, and the filing of a divisional application of said reissue application, which divisional application forms the subject-matter of the present suit, and to which divisional application Serial No. 705,642 was given.

5. He admits that said divisional application was filed in accordance with the laws of the United States and the rules of the Patent Office.

6. He admits that said divisional application was duly prosecuted.

7. He admits that the primary examiner finally rejected the claims of said divisional application recited in paragraph 7 of the Bill.

8 8. He admits that plaintiff appealed from the decision of the primary examiner to the Board of Appeals and that the Board affirmed the rejection by the primary examiner in its decisions dated September 20, 1934, and October 22, 1934.

9. He admits that said claims are held unpatentable in view of the prior art patents:

Eremeeff,	1,676,983,	April 6, 1915,
Rasch, French,	475,931,	

Profert of copies of these patents is hereby made.

10. He admits that paragraph 10 of the Bill includes correct quotations of portions of the decision of the Board of Appeals dated September 20, 1934.

11. He admits that paragraph 11 of the Bill sets forth the grounds upon which plaintiff contends the said claims are patentable, but denies that the said claims are patentable in view of the patents cited in paragraph 9 of this Answer.

12. He admits that plaintiff made averments in the oath of his said divisional application as set forth in paragraph 12 of the Bill except the averment as to commercial use, of which the defendant has no information, but defendant denies that the averments support the allowance of the claims.

FURTHER ANSWERING, defendant denies that plaintiff is entitled to an allowance of said claims as more fully appears from the decisions of the Primary Examiner and the Board of Appeals, copies of which will be presented at the trial of the case.

WHEREFORE defendant having fully answered the Bill of Complaint denies that plaintiff is entitled to the relief demanded or any part thereof and prays that the Bill be dismissed with all costs of the proceedings against the plaintiff as provided in Section 4915 R. S.

CONWAY P. COE
Commissioner of Patents, Defendant.

T. A. HOSTETLER,
Solicitor of the U. S. Patent Office,
Attorney for Defendant.

9 DISTRICT OF COLUMBIA: *ss.*

I, Conway P. Coe, Commissioner of Patents, depose and say that I have read the above answer by me subscribed and know the contents thereof, and that the statements of facts therein made as upon personal knowledge are true, and those made upon information and belief I believe to be true.

CONWAY P. COE
Commissioner of Patents.

Subscribed and sworn to before me this 29th day of April, 1935.

ALBERT W. KAISER
(Seal) *Notary Public, D. C.*

My commission expires March 21, 1938.

Memorandum of Court

Filed March 12 1936

* * * * * * * *

I think that the plaintiff is entitled to a patent embodying his claim numbered "7".

As to the remaining claims I agree with the opinions of the tribunals of the Patent Office.

BAILEY,
J.

Final Decree

Filed April 2- 1936

* * * * * * * *

This cause having come on to be heard and having been tried in open court and argued by Counsel for the respective parties upon the pleadings and proofs adduced and submitted to the court, and upon consideration thereof;

It is hereby ADJUDGED, ORDERED AND DECREED,

This 2nd day of April, 1936, that the Plaintiff Paul Kollsman, is entitled to Letters Patent on his application, Serial No. 705,642, filed January 8, 1934, entitled "Quick Reading Indicator", said patent to include the following claim:

7. An altimeter having a scale, an indicator, a plurality of pointers movable in the ratio of one to ten by the indicator, said pointers being coordinated with said scale, and the indicator and scale being rotatable relatively to each other.

And it is further ADJUDGED, ORDERED AND DECREED That the Commissioner of Patents be, and hereby is authorized to issue such patent upon the filing of a copy of the adjudication and otherwise complying with the requirements of the law.

Such patent shall not include claims numbered 1 to 6, inclusive, in the Bill of Complaint, which are the claims of the aforesaid application Serial No. 705,642, which were rejected by the Patent Office and which rejection is by this Court believed to be proper, and as to these claims the Bill of Complaint is hereby dismissed with costs against the plaintiff.

JENNINGS BAILEY
Justice.

Approved as to form:

W. W. COCHRAN
Solicitor for the Defendant.

From that portion of the foregoing decree which dismisses the Bill as to Claims 1, 2, 5 and 6, the Plaintiff notes an appeal to the U. S. Court of Appeals for the District of Columbia; whereupon an undertaking to act as a cost bond is hereby fixed in the sum of $100.00/100, with leave to deposit $50.00 cash with the Clerk in lieu thereof.

JENNINGS BAILEY
Justice.

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11 *Memorandum*

APRIL 2—1936.
$50 deposit in lieu of bond on appeal.

Order Extending Time to File Designation of Record

Filed April 16 1936

* * * * * * * *

On motion of Leonard Day for Plaintiff, the time for Plaintiff to file with the Clerk the designation of record be and the same hereby is extended to and including April 29, 1936.

JESSE C ADKINS
Justice

Consented to by Solicitor for Defendant
W. W. COCHRAN

Findings of Fact

Filed April 21 1936

* * * * * * * *

1. Plaintiff's application in suit discloses an altimeter comprising an aneroid element, an altitude scale graduated in a decimal system, pointers operatively connected with the aneroid element for indicating altitudes on said scale, the pointers being intergeared to move in the ratio of ten to one, manual means for resetting the pointers, means for rotating the aneroid element relative to said scale, an index member mounted for movement along said scale, and manual means for moving said index member in either direction, said last mentioned means simultaneously moving said pointers a compensating amount in the opposite direction.

2. The Patent of Eremeef, No. 1,676,983, (defendant's Exhibit A) discloses an altimeter comprising an 12 aneroid element, an altitude scale, graduated in the decimal system, pointers operatively connected with the aneroid element for indicating altitudes on said scale, the pointers being intergeared to move in the ratio of four to one.

3. The French patent to Societe Charles Zang & Cie, No. 557,424, (defendant's Exhibit D) discloses an instrument for measuring the flow of gas, having two dissimilar pointers constrained to rotate in the same direction in the ratio of ten to one, and a cooperating scale graduated in the decimal system for indicating the amount of flow of gas, and means for relatively setting said pointers and scale.

4. The Swiss patent to Compagnie pour la Fabrication des Compteurs et Material d'Usines a Gaz of Paris, France, No. 51,663, (defendant's Exhibit E) discloses a dial and cooperating pointers adapted to be applied to meters of water, gas, etc., said pointers being constrained to rotate in the ratio of ten to one and said dial being graduated in the decimal system.

5. The patent to Munnell, No. 309,240, (defendant's Exhibit B) discloses a register for indicating the number of cash payments or sales comprising a dial graduated in the decimal system and two pointers cooperating therewith and relatively movable in the ratio of ten to one for indicating the number of times the register is operated.

6. The French patent Rasch, No. 475,931, (defendant's Exhibit C) discloses a gas meter having concentrically pivoted pointers connected by means causing them to rotate in the same direction with a relative speed of ten to one and a cooperating dial and a scales graduated in the decimal system, said pointers each having a relatively long indicating portion extending in one direction from the pivot and a relatively short portion extending in the opposite direction from said pivot, the latter portion serving 13 to counter-balance in some degree the weight of the longer portion of the pointer.

7. The valve 29 of the Eremeef device constitutes a means for relatively setting the pointers 47 and 48 relative to the scale 51.

8. Aeroplane instruments like Plaintiff's Exhibits 5 and 6 embodying the combinations of the seven claims of said divisional application 705,642 have gone into extensive public use and have become standard for the U. S. Army and Navy and for commercial passenger carrying aeroplanes in the United States, but the commercial success which plaintiff's altimeter has attained is due in part to other features of his altimeter than those specified in the claims 1 to 6, inclusive.

Conclusions of Law

1. No invention was required either to conceive or to carry into effect a change in the gears interconnecting the pointers of the Eremeef device, to cause the shorter pointer thereof to move one-tenth the distance moved by the longer pointer, in view of the teaching of any one of the patents Munnell, No. 309,240, Rasch, French, No. 475,931, Zang et Cie, French, No. 557,424, and Compagnie pur la Fabrication des Compteurs et Materiel d'Usines a Gaz of Paris, France, (Swiss) No. 51,663.

2. No invention was required to inclose the Eremeef device in a casing in view of the common practice to provide casings for instruments.

3. No invention would be required to provide the Eremeef device with a manual means for relatively setting the pointers and the scale, such as is shown in the French patent to Zang, No. 557,424.

4. Claims 1 to 6, inclusive, are unpatentable over
14 the prior patents adduced by defendant.

5. Plaintiff is entitled to an allowance of claim 7.

6. The Bill should be dismissed as to claims 1 to 6, inclusive and granted as to claim 7.

JENNINGS BAILEY
Justice.

April 21, 1936.

15 *Assignment of Error.*

Filed April 29 1936

* * * * * * * * *

Now comes the Plaintiff in this cause and says that the decree entered in this cause on or about April 2, 1936 and the findings of fact and conclusions of law entered in this case on or about April 21, 1936 are erroneous and unjust to Plaintiff, and Plaintiff assigns for errors in said decree and findings the following matters, to wit:

1. In decreeing that the bill of complaint be dismissed as to claims 1, 2, 5 and 6, whereas the Court should have granted the prayer of the bill of complaint as to claims 1, 2, 5, 6 and 7.

2. In concluding that claims 1, 2, 5 and 6 did not involve invention.

3. In concluding that no invention was required either to conceive or to carry into effect a change in the gears interconnecting the pointers of the Eremeef device, to cause the shorter pointer thereof to move one-tenth the distance moved by the longer pointer, in view of the teaching of any one of the patents, Munnell, No. 309,240, Rasch, French No. 475,931, Zang et al, French No. 557, 424, and Compagnie pur la Fabrication des Compteurs et Materiel d'Usines & Gaz of Paris, France, (Swiss) No. 51,663.

16 4. In concluding that no invention would be required to provide the Eremeef device with a manual means for relatively setting the pointers and the scale, such as is shown in the French patent to Zang, No. 557,424, whereas the French patent to Zang 557,424 being a gas meter has its pointers driven by a vane which may move backwards or forwards through gas with only limited resistance and therefore its pointers may be engaged directly, and be moved manually together with the vane to effect a new setting of the pointers without injury to the mechanism while, on the contrary the mechanism of plaintiff's claims 1, 2, 5 and 6 recites pointers operated back and forth from a yielding element such as (an aneroid capsule) so that any manually directed manipulation of the pointers of plaintiff's structure must either break the mechanism or result in the pointer's flying back to their original indication as soon as the manual directed engagement ceases.

5. In concluding that claims 1, 2, 5 and 6 are unpatentable over the prior patents adduced by defendant. .

6. In concluding that plaintiff's structure had two means, one manual means for resetting the pointers and a second means for rotating the aneroid element relative to said scale.

7. In concluding that the patent to Eremeef No. 1,676,983, (defendant's exhibit A), discloses an altimeter, whereas it was merely a paper patent disclosing nothing operative as an altimeter.

8. In not concluding that the structure of French patent to Zang 557,424 (defendant's exhibit D), the Swiss patent 51,663 (defendant's exhibit E), patent to Munnell 309,240 (defendant's exhibit B), and the French patent to Rasch 475,931 (defendant's exhibit C) were limited to a mechanism capable of moving pointers only one way and were incapable of indicating a condition varying in two eays (atmospheric pressure) in response to a yielding element.

17 9. In not concluding that the valve 29 of the Eremeef device was not an operative device for setting pointers of an aeroplane instrument.

10. Wherefore, and for diverse other errors appearing in said record said plaintiff prays that said decree be reversed as to claims 1, 2, 5 and 6, and that said plaintiff may have an adjudication and decree in his favor as to claims 1, 2, 5, 6 and 7.

PAUL KOLLSMAN
LEONARD DAY
By His Attorney

Acknowledgment of service this 29th day of April, 1936.

W. W. COCHRAN
Attorney for Defendant.

Supreme Court of the District of Columbia

Friday, May 8, 1936

The Court resumes its sessions pursuant to adjournments, the Justices sitting in Equity, presiding.

* * * * * * * * *

Come now the parties hereto by their respective attorneys of record, and thereupon, the plaintiff by his attorney presents to the Court his Statement of Evidence taken at the trial of this cause, and prays that the same be signed and made of record, nunc pro tunc, which is hereby accordingly done.

JENNINGS BAILEY,
Justice.

18 ORDER OF COURT OF APPEALS IN RE EXHIBITS

Filed May 25 1936

In the Court of Appeals of the District of Columbia

PAUL KOLLSMAN
Plaintiff Appellant
vs.
CONWAY P. COE, Commissioner of Patents,
Defendant Appellee

District Supreme Court

Equity 58,618.

On motion of Paul Kollsman, by his attorney, Leonard Day, and

It appearing by stipulation between the attorneys for the respective parties that, in Plaintiff's Exhibit 1, the prints of the drawing as originally filed (found immediately preceding paper No. 2) and papers 3, 4, 5, 8, 10, 11 and 15 thereof are not necessary for a consideration of the issue of this cause; and that Plaintiff's Exhibit 2—Printed copy of Plaintiff's Original Patent; Exhibit 5—Plaintiff's (commercial) instrument; Exhibit 6—Plaintiff's commercial instrument, open; Exhibit 7—Plaintiff's catalog; Exhibit 8—Defendant's letter; Exhibit 9—Eremeef model; Exhibit 11—first bundle prior art; and Exhibit 12—second bundle prior art, may be considered by this Court adequately as physical exhibits and that the printing thereof as a part of the record would occasion undue expense.

IT IS HEREBY ORDERED that the aforesaid parts of Plaintiff's Exhibit 1 and Plaintiff's Exhibits 2, 5, 6, 7, 8, 9, 11 and 12 are acceptable as physical exhibits and that the printing thereof as a part of the record be and the same hereby is dispensed with.

Dated, Washington, D. C.
May 20, 1936.

BY THE COURT
(Signed) GEORGE E. MARTIN,
Chief Justice.

Consented to
(Signed) W. W. COCHRAN,
Attorney for Defendant Appellee

19 A true Copy,
Test: MONCURE BURKE—
(Seal) *Clerk, of the United States Court of Appeals for the District of Columbia*

Designation of Record

Filed April 29 1936

* * * * * * * * *

TO THE CLERK;

Sir:

Plaintiff, appellant, by his attorney LEONARD DAY, designates the following to constitute the transcript of record on the appeal in the above-entitled cause:

1. Bill of Complaint.
2. Answer to Bill of Complaint.
3. Memorandum opinion.
4. Final decree and order allowing appeal.
5. Findings of fact filed by Plaintiff.
6. Order extending time.
7. Memorandum of deposit on appeal.
8. Findings of Fact and conclusions of law.
9. Defendant's exhibits.
10. Stipulation re Physical Exhibits and Statement of Evidence.
11. Assignments of error.
12. This designation of record.

LEONARD DAY
Attorney for Plaintiff

Service acknowledged this 29th day of April, 1936.

W. W. COCHRAN
Attorney for Defendant.

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20 District Court of the United States for the District of Columbia.

UNITED STATES OF AMERICA,
District of Columbia, ss:

I, Charles E. Stewart, Clerk of the said Court, hereby certify the foregoing pages, numbered from 1 to 19, both inclusive, to be a true and correct transcript of the record, according to directions of counsel herein filed, copy of which is made part of this transcript, in cause No. 58618 in Equity, wherein Paul Kollsman is Plaintiff and Conway P. Coe, Commissioner of Patents, is Defendant, as the same remains upon the files and of record in said Court.

IN TESTIMONY WHEREOF, I hereunto subscribe my name and affix the seal of said Court, at the City of Washington, in said District, this 6th day of July, 1936.

C. E. STEWART,
(Seal) *Clerk.*

21 In the Supreme Court of the District of Columbia

HOLDING AN EQUITY COURT

Equity No. 58,618.

Filed May 8 1936

FRANK E. CUNNINGHAM,
Clerk.

PAUL KOLLSMAN, *Plaintiff*

vs.

CONWAY P. COE, Commissioner of Patents, *Defendant.*

Washington, D. C., April 29, 1936.

Stipulation Re Physical Exhibits and Statement of Evidence.

It is hereby stipulated and agreed that the following exhibits which were introduced and received in evidence on behalf of plaintiff at the hearing of the above entitled cause, hereby be transmitted to and considered by the Court of Appeals of the District of Columbia, as the physical exhibits, to wit:

Plaintiff's Physical Exhibits.

1. A certified copy of the file wrapper contents of the application in suit.

Except that plaintiff's exhibit 1, which shall be printed as a part of the record shall omit the following:

Prints of the drawings as originally filed (found immediately preceeding paper No. 2. Papers 3, 4, 5, and 8, 9, 10, 11 and 15.

2. Printed copy of Plaintiff's original patent.
5. Plaintiff's commercial instrument.
6. Plaintiff's commercial instrument, open.
7. Plaintiff's catalogue.
8. Defendant's letter.
9. Eremeef model.

22 11. First Bundle Prior art.
Containing printed copies of the following:

Patent No.	Name	Pat. Date
1,325	Smith Beers	Sept. 14, 1839
7,277	William Welch	Aug. 22, 1876
8,085	John R. St. John	May 13, 1851
18,648	Thomas I. Pitt	Nov. 17, 1857
45,157	Austin D. Hoffman	Nov. 22, 1864
46,309	Thomas Shaw	Feb. 7, 1865
53,564	L. C. Bristol	Apr. 3, 1866
69,877	W. Welch	Oct. 15, 1867
76,940	Wm. B. O. Peabody	Apr. 21, 1868
110,605	William Z. Taylor	Dec. 27, 1870
150,640	Daniel Warren	May 5, 1874
194,548	Willis Churchill	Aug. 28, 1877
196,668	Japy et al	Oct. 30, 1877
264,238	Geo. B. Burton	Sept. 12, 1882
285,921	Wm. B. Patterson	Oct. 2, 1883
286,645	Geo. W. Sharp	Oct. 16, 1883
309,240	Thos. Munnell	Dec. 16, 1884
310,860	Horace T. Field	Jan. 13, 1885
324,042	Sylander C. Shepard	Aug. 11, 1885
337,859	Lloyd Nottingham	Mar. 16, 1886
346,852	Morris F. Koch	Aug. 3, 1886
353,781	Jos. Deutschbein	Dec. 7, 1886
423,880	Kasper H. Schaper	Mar. 18, 1890
440,374	Fredinand D. Smith	Nov. 11, 1890
473,465	John A. James et al	Apr. 26, 1892
502,649	Hans G. Andersen	Aug. 1, 1893
516,635	Peter Scott	Mar. 13, 1894
568,565	Frank S. Grant	Sept. 29, 1896
575,476	James F. Goodridge	Jan. 19, 1897

Patent No.	Name	Pat. Date
576,967	Charles T. Higginbottom	Feb. 3, 1897
577,756	Charles W. Kelley et al.	Feb. 23, 1897
584,715	Cornelius C. E. Van Alstine	June 15, 1897
592,255	Charles B. Post	Oct. 26, 1897
637,992	Levin T. Jones	Nov. 28, 1899
765,531	Richard E. Weston	July 19, 1904
795,403	August Meyer	July 25, 1905
873,754	Philip L. Johnson	Dec. 17, 1907
1,007,231	Horatio B. Osgood	Oct. 31, 1911
1,012,270	" " "	Dec. 19, 1911
1,054,618	Wm. A. Reineke	Feb. 25, 1913
1,094,594	Henry H. Rich	Apr. 28, 1914
1,196,859	Burnett B. Hart	Sept. 5, 1916
1,245,344	Wm. N. Howden	Nov. 6, 1917
1,286,006	Wm. N. Howden	Nov. 26, 1918
1,336,351	Hosea Hathaway	Apr. 6, 1920
1,413,278	Edmond Jaeger	Apr. 18, 1922
1,458,323	Jas. L. Burnham	June 12, 1923
1,499,293	Jos. H. Cole	June 24, 1924
1,508,121	John K. Olsen	Sept. 9, 1924
1,579,576	Henry Theobald	Apr. 6, 1926
1,651,558	Charlotte M. Sheridan	Dec. 6, 1927
1,663,211	Alexander Mc Nab	Mar. 20, 1928

23 12. Second Bundle Prior Art:
Containing Printed Copies of the following:

PATENTS & PUBLICATIONS.

1.	Paul Kollsman	No. 1,741,702	Dec. 31, 1929
2.	G. P. Luckey	1,749,494	Mar. 4, 1930
3.	"Aviation"		Nov. 2, 1929
4.	"Airway Age"		Nov. 1929
5.	"Equipment used in Experiments to solve the problem of "Fog Flying"		Mar. 1930.

PRIOR ART PATENTS

45,157
53,564
309,240

364,962
428,588
576,967
661,096
668,601
765,531
843,887
869,909
1,315,858
1,485,152
1,676,983
1,825,281
1,873,106
59,230 (Fr.) June 29, 1863
59,230 (Fr.) 1st addition Dec. 31, 1863
59,230 (Fr.) 2nd addition June 28, 1864
59,230 (Fr.) 3rd addition July 5, 1865
607,685

It is further stipulated and agreed that on the appeal of the above entitled cause to the Court of Appeals of the District of Columbia, counsel for plaintiff may retain possession of all plaintiff's physical exhibits, subject to examination by counsel for defendant at any time and subject to production and filing in the Court of Appeals of the District of Columbia, at or before the hearing on appeal.

It is further stipulated and agreed that Paul Kollsman, Walter Angst and Charles S. Jones (Casey Jones) were called as witnesses and appeared in open court, were duly
sworn as such, at the trial of the above entitled
24 cause, and that they testified substantially as set
forth in the statement of evidence attached hereto as
part of this stipulation.

LEONARD DAY
Attorney for Plaintiff

R. F. WHITEHEAD
W. W. COCHRAN
Attorneys for Defendant.

25 *Statement of Evidence*

In the Supreme Court of the District of Columbia

Holding an Equity Court

Equity No. 58,618

PAUL KOLLSMAN,
Plaintiff
vs.
CONWAY P. COE, Commissioner of Patents,
Defendant.

Testimony of Paul Kollsman

I am the inventor named in the application involved in this suit. I am an engineer and the manager of Kollsman Instrument Company, manufacturing airplane instruments, with license under my inventions. It took me two years of persistent experimentation and work to develop my sensitive altimeter indicating altitude in response to an aneroid capsule in the decimal system over a single circular scale by means of two pointers rotating in the ratio of 10 to 1, and having an index movable relatively to the scale and so connected with the pointers that when the index is moved in one direction, the pointers are moved a compensating amount in the other direction. This instrument must indicate true altitude when a plane ascends and with equal accuracy must indicate true altitude when a plane descends. The hundredths pointer must make 10 complete rotations for one rotation of the thousandths pointer. My problem, which I solved, included how to make a pointer rotate accurately this many times in each of two directions in response to a yielding element and not be subjected to great error in an aeroplane where there is much vibration and where the direction of gravity changes. It wasn't merely the problem of making two pointers rotate in the ratio of 10 to 1 to each other but rather to make it possible to rotate the high speed pointer accurately in both
26 directions in response to a yielding element, while at the same time a range indicating pointer is rotating one-tenth as much. I don't claim to have invented the decimal system but to have made possible the reading of aero-

plane instruments responsive to a yielding element, itself responsive to an external force, in the decimal system.

Exhibit "5" is an exhibit of one of my commercial instruments embodying the claims in this suit.

Exhibit "6" is another commercial instrument open to give a view of the yielding element in the form of an anaeroid capsule.

Exhibit "7" is the present day catalogue of the Kollsman Instrument Company which manufactures and sells my inventions.

Exhibit "9" is a model operating with the pointers in the ratio of 4 to 1 like what is described in defendant's Exhibit "A", Eremeef Patent.

I was the first to put on the market a sensitive altimeter reading in the decimal system.

My altimeter has become standard for the United States Army, the United States Navy, the United States Commercial Air Service. Many thousands of aeroplane instruments embodying the claims in suit have gone into commercial use and have been sold by the companies licensed by me.

In my aeroplane instrument the dial and the whole mechanism are rotated relatively to each other for setting the pointers.

The pointers in my altimeter indicate in response to a yielding element and must work accurately both up and down.

27 *Testimony of Walter Angst*

I am an engineer trained in instrument design and am employed by the Kollsman Instrument Company and worked as an assistant to Mr. Paul Kollsman in the development of his decimal system reading aeroplane instrument. It was not merely to make pointers rotate in the ratio of 10 to 1 that Mr. Kollsman strove to accomplish. It was to make a sensitive altimeter and sensitive aeroplane instruments work in response to a yielding element that did not move more than about a twentieth of an inch so that they would read on a dial scale from pointers rotating 10 to 1 to each other and so that the 10 pointer had to go around in one direction many times and then backwards many times and so as to read accurately throughout the whole movement in response to this weak yielding element.

I don't claim that with pointers geared like those in the Eremeef patent it required more than machanical skill to make the pointers relatively move 10 to 1 to each other.

The Eremeef Patent does not disclose a sensitive altimeter, constructed in the manner described it is really operative only as an uncalibrated thermometer. The large amount of air in the chamber 12, although it is heat insulated, gradually takes on the temperature of the outside air and the expansion or contraction of this large charge of air works bellows 27 to change the indication of the pointers 47 and 48 much more than can be effected by any change of air pressure working on the bellows 27.

So after an aeroplane fitted with the Eremeef apparatus has been in the air one-half hour, its pointers couldn't indicate altitude but would falsely indicate the combination effect of the change of temperature of the air in chamber 12 and the change of pressure due to some altitude.

28 Eremeef says after his instrument is carried up 4000 feet, it should be re-set by opening the bellows 27 to the atmosphere but such an act throws the instrument out of all dependability because the atmospheric pressure on the ground may have changed and it is impossible to pick out in the atmosphere just the place where the pressure is right for re-setting the instrument.

It took us more than two years to produce the sensitive altimeter embodying all the features described in the application in suit.

Testimony of Charles S. Jones

I am now the head of "Casey Jones School of Aeronautics" and am also known as Casey Jones. I am a licensed aeroplane pilot carrying license No. 13, when current license numbers are now numbered into the thousands. I flew as pilot during the World War and continuously thereafter down to a recent date. I have been familiar with and have actively participated in the art of flying for 20 years. Before the Kollsman altimeter embodying the 10 to 1 decimal system of reading and other features not found in previous altimeters came on the market, it was foolhardy to attempt a blind landing in an aeroplane. That Kollsman instrument contributed largely to the safety of blind flying. It went into general use as soon as it was known to aviators. One great advantage it has is that you can read it in a mental flash. When one bears in mind that many instruments on the instrument board must be read frequently and the altimeter is about the most important instrument to be read in making a landing, it is of outstanding importance to get an altitude reading without any calculation and an accurate one. In my opinion, the Kollsman instrument is the first sensitive altimeter which gave this quick reading in the decimal system. 29 It's not only important to read the altitude quickly in making a landing but it is necessary to read quickly when flying towards mountains in a fog. It is customary to set an altimeter so it will read "zero" as it reaches the landing field. This is regardless of whether the field itself is a few feet above sea level or a thousand feet or more above sea level. The Kollsman altimeter is regarded as standard by pilots.

Before the Kollsman altimeter we had to try to read altitude from one pointer on a dial in increments of 1000 feet subdivided on the dial by 100 ft. marks. Kollsman made it ten times more accurate and quick reading. When an aircraft is descending to a field having an elevation for which the altimeter is set to read zero, and the altimeter has two pointers, one indicating thousands of feet and the other indicating hundreds of feet, the pilot, when the craft is less than 1,000 feet above the ground, directs his attention only to the latter pointer. Both pointers will approach zero as the craft nears the ground, regardless of the relative rate of motion between the pointers.

30 The foregoing is a true and correct statement in substance of all the evidence offered on the hearing of the above entitled cause on behalf of the parties plaintiff and defendant as offered, given and received in open Court and the same is accordingly approved as such to become and be part of the record on the appeal in the said cause, according to the provisions of the rule of Court in such case made and provided, this 8th day of May, 1936.

JENNINGS BAILEY,
Justice.

31 DEPARTMENT OF COMMERCE

UNITED STATES PATENT OFFICE

To all persons to whom these presents shall come, Greeting:

THIS IS TO CERTIFY that the annexed is a true copy from the records of this office of the File Wrapper, Contents and Drawings, in the matter of the

Pending Application of
PAUL KOLLSMAN,

Filed January 8, 1934, Serial Number 705,642,
for the Reissue of Letters Patent
Number 1,857,311, Dated May 10, 1932,
for
Improvement in Quick Reading Indicator.

In Testimony Whereof I have hereunto set my hand and caused the seal of the Patent Office to be affixed, at the City of Washington, this thirty-first day of December, in the year of our Lord one thousand nine hundred and thirty-five and of the Independence of the United States of America the one hundred and sixtieth.
(Seal)

CONWAY P. COE
Commissioner of Patents.

Attest:
D. E. WILSON
Chief of Division.

(Here follows photostats marked pages 32 and 33.)

3064

NUMBER (Series of 1925)

705642

1934

DIV. 36

REISSUE NO.

DATED

(EX'R'S Book) [illegible]

Division of Original Patent No. .... granted ...., 193

Name PAUL KOLLSMAN

of NEW YORK

State of NEW YORK

Invention QUICK READING INDICATOR

APPLICATION FILED COMPLETE, JAN 8, 1934

PARTS OF APPLICATION FILED

Petition, ~~Specification~~, Oath, Fee $50, ~~Old Patent~~, ~~Abstract~~ of Title, 4 Sheets Drawings, JAN 8, 1934

Original Patent No. 1,857,311 *Date* MAY 10, 1932

Examined and Passed for Issue .... *Exr. Div.* ...., 19

Notice of Allowance ...., 193

By Commissioner.

Attorney LEONARD DAY 38 PARK ROW, NEW YORK, N. Y.

Associate Attorney

No. of Claims Allowed .... *Class* ....

Title as Allowed

32

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MAIL DIVISION
JAN-8 34
U.S. PATENT OFFICE

705642
-36

January 6,
1934.

Hon. Commissioner of Patents,
Washington,
D. C.

Re: Docket 3064

Sir:

I enclose herewith application papers for divisional reissue application of Paul Kollsman for Quick Reading Indicator.

Papers include petition, specification, oath, and four sheets of drawings, and currency in the amount of $30.00 covering the filing fee.

Respectfully,
Leonard Day
LEONARD DAY.

LD:F

Encls.

Alt. papers with Div A, Appn Div
F. Dm 1-8-34

34 Filed January 8, 1934, 705642

UNITED STATES PATENT OFFICE

Petition

HON. COMMISSIONER OF PATENTS:

DOCKET 3064.

Your petitioner, Paul Kollsman, a citizen of the United States, and now a resident of the Borough of Manhattan, County, City, and state of New York, whose post office address is 1 Junius Street, Brooklyn, New York, represents that he did, in connection with his petition for reissue dated October 25, 1932, surrender his original Letters Patent No. 1,857,311, for improvements in INDICATORS, granted to him on the 10th day of May, 1932, and did pray therein for the reissue thereof, and that he did thereupon file application for said reissue of Patent No. 1,857,311, which application was filed October 27, 1932, Serial No. 639,897; and

Whereas it has come to your petitioner's attention that more than one reissue patent are necessary, there being properly divisible subject matter set forth in the aforesaid reissue application, which he now owns,

Now your said petitioner, PAUL KOLLSMAN, prays that the said original Letters Patent may be reissued to him in part for the same invention upon the annexed divisional specification, the same being a division of his above entitled application for reissue, Serial No. 639,897, the abtract of title having been filed in connection with his original application for reissue filed October 27, 1932, Serial No. 639,897, the designation of the present divisional application for reissue being QUICK READING INDICATOR; and

He hereby appoints as his attorney, LEONARD DAY (Reg. No. 7340), of 38 Park Row, New York, N.Y.,
35 with full power of substitution and revocation, to prosecute this application, to make alterations and amendments therein, to receive the reissued Letters Patent, and to transact all business in the Patent Office in connection therewith.

Signed at New York, N.Y., this 6 day of January, 1936.

PAUL KOLLSMAN

CHAS. BEHRMAN
(Seal)
Notary Public, Queens County 106
Queens County Register No. 1368
N. Y. County Clerk's 1103, Register 43741
Kings County Clerk's 233, Register 4299
Term Expires March 30, 1934

36 This application is a division of my co-pending application Serial No. 639,897, for the reissue of my patent No. 1,857,311, said application having been filed on October 27, 1932.

This invention relates to indicators and more particularly to aneroid altimeters. A quicker and more dependable understanding of the objects of the invention will be had by referring first superficially to the structure by reference character. The outer stationary casing 12 is a housing for mounting the whole altimeter in an instrument panel. Any well-known type of aneroid or barometric pressure responsive mechanism included in the aneroid means 11 operatively connects with and rotates the spindle 45 of large pointer 43 in response to changes in barometric pressure. Spindle 45 passes freely through the front plate 16 of the aneroid means 11 into the interior of its enclosing sub-casing. This front plate 16 is made fast to the sub-casing of the aneroid means 11 and is in the form of a gear by which the aneroid means is rotatedly adjustable relatively to the stationary casing 12 by a setting means.

The parts visible through the glass 40 broadly speaking are indicating means or elements. In this broad class are included pointer means, pointer elements or pointers such as the pointers 43 and 44, which preferably constitute all of the indicating means which is moved by the power of the aneroid means. Also included under the broad definition "indicating means" are the dial means or scale means such as the dials 32, 58, and 59. Likewise broadly included under the term "indicating means" are the reference means, reference elements, or reference market such as the

reference elements 36, 60, and 27, although the reference
37 element 27 is shown in the form of a rotatable
member bearing a series of indicating reference numbers.

Setting means manually operable by the knurled knob 53 functions to effect relative setting movements or adjustments involving some or all of the indicating means and, if desired, the aneroid means. This setting movement, effected by the setting means, is in contradistinction to the operative movements of the pointer means by the aneroid mechanism of aneroid means 11—altitude responsive means.

This specification most particularly relates to features which make possible the rapid reading of an indication regardless of whether the indication to be read is in response to the actuation of an aneroid means usually employed in connection with altimeters, or to actuating means usual for tachometers, or to indicators for stress, flow, air speed, and the like. More particularly, the object of the invention is to provide for the instantaneous reading in the decimal system without calculation of any kind and through the medium of at least two dissimilar pointers.

A further particular object of the invention is to simplify and speed up the reading of an indicating instrument over a wide range. To this end I provide a dial having a single scale divided uniformly from one to ten, cooperating with two unlike pointers concentric with the said scale and operating in response to the aneroid means in proportion to changes in barometric pressure in the ratio of one to ten, with their zero positions corresponding to the zero on the single scale. By this arrangement, in carrying out this object of my invention, the complete rotation of one pointer
may represent a thousand foot change in altitude,
38 which is indicated by the other pointer by one major
division on the scale.

A large pointer may be a high speed pointer and a shorter pointer a low speed pointer. If the short pointer indicates somewhere between "2" and "3" on the single scale, and the long pointer indicates "5", a glance at the pointers on the single scale instantly indicates 2500 feet without any cooperative calculation. This indicating means instantly indicates altitude in strict accordance with the decimal system with all the accuracy of a sensitive pointer and all the necessary range of a slow motion pointer.

A further object of the invention is to provide suitable interconnecting gearing and setting means for setting such pointers having a ten to one ratio to accord with the setting of a reference element, preferably to any indication throughout the entire practical range of flying, and so as to accord with my heretofore mentioned object of causing the sum of setting changes to equal zero.

The above and further objects of the invention will be particularized more fully in the following claims, which are directed to illustrative embodiments of the invention described in the following specification in connection with the accompanying drawings for purposes of illustration and not limitation.

In the drawings Fig. 1 is an enlarged vertical section through the altimeter at right angles to its normal position on the instrument board, with part broken away at the locality of the aneroid means; Fig. 2 is a section at right angles to the section of Fig. 1 through the plane of line 2—2; Fig. 3 is a front elevation of the altimeter with one embodiment for the indicating means indicating the ele-
39 vation of 1340 feet relatively to sea level; Fig. 4 is
a view similar to Fig. 3 of the same instrument set for landing on a landing field with an altitude of 400 feet; Fig. 5 is a view similar to Fig. 3 of the same instrument and with the same setting, but with the indicating means rotated for level flight in accordance with one object of the invention; and Fig. 6 is a front elevation of the altimeter of my invention with the indicating means set for level flight at 940 feet net and subsequent landing upon a landing field with the elevation of 400 feet above sea level.

The embodiment of the indicator shown is an altimeter 10 of the type actuated by an atmospheric pressure sensitive means, shown in the form of any approved aneroid means 11, the entire mechanism of which is preferably housed within a cylindrical shell or subcasing mounted preferably concentrically within the stationary casing 12 adapted to be fixedly mounted in the instrument panel in the position indicated in the figures.

Broadly speaking, such aneroid means provides a yielding element operated by a varying force.

The entire aneroid means is shown mounted for manual adjustable rotation. A hub 13, suitably fixed to and axially of the stationary casing 12, journals a stub shaft 14 fixed to the sub-casing of the aneroid means 11, and is shown retained by a screw 15. The front of the aneroid means is closed by a front plate 16 fixed thereto and shown in the form of a gear. This gear 16 has a circular recess 17 affording rotary bearing engagement on an angular portion 18 of housing 12. By reason of this angular formation 18 an annular enlargement 19 is afforded for receiving the toothed part of the gear 16 and other parts presently to be described.

Associated with and in front of the gear 16 is a gear 20, which is shown to be concentric with and of equal diameter with the gear 16 and, under certain conditions, may be rotatable relatively thereto. This gear 20 may be mounted in a suitable manner. It is formed integral with a hub 22 bearing in the circular recess 21 formed concentrically with the gear 16. The cylindrical hub 22 has a front wall or closure 23, serving as a mount for other parts presently to be described.

Journaled externally on the cylindrical hub 22 is a gear 24 in front of the gear 16 and between it and the gear 20, but spaced apart therefrom a sufficient amount to accommodate the gear 25 of smaller diameter and made fast thereto in any suitable manner, as by screws. This gear 25 is of smaller diameter than gears 16, 20, and 24 and is determined by a gear ratio presently to be described.

Also journaled on the exterior of cylindrical hub 22, but on the front side of gear 20, is a gear 26 of smaller diameter. This gear 26 functions to carry a reference means such as the ring shaped numeral bearing rotary member 27 or the single reference marker 60 of Fig. 6. The rotary reference member 27 bears numerals in graduated order indicating barometric pressures as they rotate into visibility through window 33. Both the reference members 27 and 60 may rotate freely 360° or more and their rotation is not limited by any stops.

Interconnecting the gears 25 and 26 is a gear train including pinions 28 and 29, both fixed to the same stub shaft 30 concentric therewith and thereby journaled in a perforation through gear 20. These gears 28 and 29 are positioned on opposite sides of gear 20,—28 in the rear thereof and 29 in front thereof. The pinion 28 engages gear 25

and pinion 29 may engage a gear 31, journaled on the web
of gear 20 and gear 31 is shown in turn engaging
41 the gear 26, whereby various relative rotations may
be caused to take place, in accordance with any one
of various manual manipulations of a setting means presently to be described.

A dial 32 is fixed relatively to gear 20 by being mounted fixedly to the front closure 23 of hub 22. This dial 32 has a window 33 in the embodiment shown in all the Figs. 1, 2, 3, 4, and 5, through which various reference elements or marks such as numbers indicating various barometric pressures in inches of mercury and fractions thereof may be observed. By reason of the fact that the rotatable member of cylindrical or ring-shaped dial 27 is capable of a complete rotation, relatively generous spacing may be employed, even though the entire range of barometric pressure, throughout which range it may be desired to make a reference setting, is employed and numerically designated on this rotatable member 27.

It should be noted that none of the gears 16, 24, 20,
42 and 35 are operated by the aneroid means 11. They
are operable solely in response to the manual manipulation of the setting means and, as indicated particularly in Figs. 1 and 2, rest in the annular enlargement 19 of the stationary casing 12 in frictional engagement therewith, which frictional engagement is at their extreme periphery, the mass of the parts tending to hold them in fixed position relatively to the fixed casing 12 until and unless they are manually adjusted by the setting means presently to be described.

For rotating the gear 35 carrying the reference marker 36 a pinion 42 may be secured on the shaft 30 in addition to the gears 28 and 29, already having been described as carried by the same shaft 30. This shaft 30 and pinions 28, 29, and 42 rotate as a unit when operated in any one of the ways presently to be described. Pinion 42 operatively engages internal gear 35.

In its complete and preferred embodiment, the altimeter has as its pointer means, a long pointer 43 and a short pointer 44, which are relatively rotatable in predetermined different degrees by the aneroid means 11, which operates through any well known connecting mechanism to rotate the spindle 45 equal angular amounts in proportion to equal changes in feet altitude. The spindle 45 extends freely through the front plate or gear 16 and through the hollow shaft or rotatable hub 46, journaled in an opening in wall 23 and dial 32 for Figs. 1, 2, 3, 4, 5, and 6.

The long or sensitive pointer 43 is secured on
43 spindle 45, and the short or range pointer 44 is carried by the hollow shaft 46. Interconnecting shafts 45 and 46 is a planetary gear train. A gear or pinion 47 is fast to the spindle 45 and meshes with gear 48. Pinion 49 is fixed to the same shaft as is gear 48, which shaft is journaled to the cylindrical hub 22, 23, which is integral with the gear 20. Pinion 49 meshes with gear 50 fixed to the hollow shaft 46 and serving to drive the range pointer 44 at any desired ratio relatively to pointer 43, preferably at the angular speed ratio of one to ten. At this point it should be noted that it is the rotatability of the cylindrical hub 22, 23 which mounts the shaft of gear and pinion 48 and 49 which constitutes the sun and planet relation in this gearing, the advantage of which will later be described.

The manually operable setting means is mounted in an extension 51 of the circular casing enlargement 19. A shaft 52 slidably extends from front to rear through this enlargement 51 and has fixed thereto a pinion 54 which, together with the shaft 52, is urged rearwardly by the compression spring 55, preferably seated in a pocket. A removable set screw 56 secured in the rear end of shaft 52 serves as a removable locking means limiting the setting operation of the pinion 54. By suitable manipulations of the setting means, various combinations of the gears 16, 24, and 20 may be operated by means of the pinion 54. With the safety locking screw 56 in place, only two combinations may be operated. With the parts positioned as shown in Figs. 1 and 2, a simple rotation of the knob 53 drives both gears 16 and 24, while gear 20 is held stationary relatively to the casing 12 in any suitable manner, as by its frictional engagement therewith. This is setting combination or position No. 1.

With the apparatus as shown in Fig. 1, by pulling
44 out on the knob 53 and turning it, pinion 54 is caused to engage all three gears 16, 24, and 20, to effect a simultaneous rotation of said three gears. This is combination or position No. 2.

If the safety locking screw 56 is removed, and the knob 53 is pulled forward slightly further than for position No. 2, pinion 54 may be caused to engage solely gears 24 and 20, whereupon a rotation of the knob 53 rotates said gears 24 and 20, while gear 16 is held stationary relatively to casing 12, as by its frictional engagement therewith. This is combination or position No. 3.

If the knob 53 is pulled still farther forward, pinion 54 will be caused to mesh solely with gear 20, whereupon a rotation of knob 53 rotates gear 20, gears 16 and 24 being held stationary in any suitable manner, as by reason of their frictional engagement with the stationary casing 12. This is combination or position No. 4.

Operation

With the parts in the position shown in Fig. 1, a rotation of shaft 52 and its pinion 54 clockwise as shown in Fig. 2, a manual setting of the altimeter may be effected with reference to a particular condition, such as the foot altitude of a landing field, the barometric pressure at a landing field, the foot altitude desired for level flight, or the barometric pressure corresponding to desired level flight. In making this manual setting (position No. 1), the pointers 43 and 44 and the reference element 36, all three relatively to the scale means upon which they read, are caused to change their indications so that the sum of the changes is equal to zero and therefore equal to a constant. Likewise a relative change between the numerical barometric pressure indications of the rotatable reference element 27 is to be made so that the sum of its change plus the change of the pointer means is also equal to a constant and to zero in the same unit of measure.

By reason of the fact that the rotary members 27 and 26 are not limited in their rotation but are free to rotate a complete rotation or 360° and more, substantially no limits are imposed upon the gear train including gears 25, 28, 29, 37 and 26, which gear train determines the angular rate of rotation for the member 27 relatively to other rotary parts such as the fast pointer 43 and the slow pointer 44. From the drawings it may be determined approximately what this relative angular rate of rotation is. The gear ratio between gears 29 and 37 is shown to be approximately 5 to 1 while the ratio of gear 25 to gear 26 through their interconnecting gears 28 and 31 is approximately 8 to 7. The complete gear train therefore gives an angular speed to the rotary member 27 relatively to gear 25 and gear 24 of 7 to 40. The rate of rotation of fast pointer 43 is unity or one. As previously described the rate of rotation of slow pointer 44 is one-tenth. Therefore, in the showing of the drawings rotary member 27 rotates slower than the fast pointer 43 and faster than the slow pointer 44, seven-fortieths being less than one and more than one-tenth.

Position No. 1

Fig. 3 shows a position of the indicating means indicating an altitude of 1340 feet, which is indicated by the pointers 43 and 44 on scale 37 relatively to zero altitude or sea level, as indicated by reference marker 36 positioned at zero, while the barometric pressure element 27 indicates 30.0 as the nearest corresponding number for normal sea
level barometric pressure. Assume that it is now
46 desired to set the altimeter for landing upon a land-
ing field with the elevation 400 feet. By telephone communication with the landing field, the foot altitude of the landing field, 400 feet, may be obtained or the corresponding barometric pressure, 29.5, may be obtained.

If the foot altitude is obtained, a clockwise rotation of knob 53, as viewed in Figs. 3, 4, and 5, serves to move the reference marker to indicate 400 feet, as shown in Fig. 4. The gearing intergearing rotatable reference element 27 causes this element to indicate the barometric pressure 29.5 corresponding to 400 feet. In like manner, if the barometric pressure of the landing field and not its foot altitude is obtained, the same clockwise rotation of knob 53 is imparted until the barometric pressure 29.5 is indicated through window 33, whereupon the corresponding foot altitude will be indicated by the reference marker 36 upon the scale 37.

Now, at the same time that these reference elements 36 and 27 are being set to correspond with the landing field condition, the pointer means is moved counter-clockwise or in a negative manner to subtract 400 feet altitude from its indication in Fig. 3, so that in Fig. 4 it correctly indicates

940 feet, the distance above the landing field, so that the pointer means will indicate zero when the level of the landing field is reached.

It is thus clear that the sum of the negative change of the pointer means relatively to its scale 37 and the positive change of the reference means 36 relatively to the same scale 37 is numerically zero, and therefore equal to a constant. In like manner, by altering the barometric pressure change from the showing that corresponded to sea level to
that corresponding to the atmospheric pressure at
47 the landing field into feet altitude, again the changes
are equal to zero.

Position No. 2.

It may be desired to continue flying at level flight at the altitude of 1340 feet. To facilitate this, with the parts in position No. 2, a rotation is imparted to knob 53, with the indicating means indicating as shown in Fig. 3 until the sensitive pointer 43 is horizontal, as shown in Fig. 5. No change in the altitude indication or reference means takes place, but the sensitive pointer 43 is horizontal so that any increase in altitude from level flight is indicated by a movement above horizontal of pointer 43 and any change below level flight is indicated by a movement of pointer 43 below horizontal. This is a more convenient telltale than the necessity of reading pointer movement from a position such as that shown in Fig. 3.

In Fig. 6, pointers 43 and 44 are intergeared in the ratio of ten to one. Each individually indicate 940 feet altitude with the pointer 43 horizontal, so that an upward movement of pointer 43 indicates a rise of the plane above, and a downward movement of this pointer indicates a downward deviation from the same indication for level flight.

Position No. 1—Gear Movement

A clockwise rotation of knob 53, assuming the aneroid indication to be as shown in Fig. 3, is imparted until either the reference marker 36 indicates the desired reference condition or the rotatable reference element 27 indicates the desired reference condition. The gear functioning to effect
this setting is as follows: Gear 20 is held fast by
48 any suitable provision such as friction. Counter-
clockwise rotation is imparted to gears 16 and 24.

Gear 25, fixed to gear 24, rotates counter-clockwise and imparts clockwise rotation to gears 28 and 29 and 42. Gear 29 imparts counter-clockwise rotation to gear 31 and gear 31, in mesh with gear 26, imparts clockwise rotation thereto. The gear ratio of the train and the numeral marking are designed to transform feet altitude into barometric pressure in inches of mercury for rotary reference element 27, and one twentieth of foot altitude indication for reference marker 60 relatively to the angular movement of pointer 43.

The clockwise rotation of gear 42 meshing with internal gear 35 imparts clockwise rotation to gear 35 and the reference marker 36 carried thereby. The gear train operating reference marker 36 is designed to impart the same angular movement to reference marker 36 as that imparted to gear 16 but in the opposite direction. The counter-clockwise rotation of gear 16 carries the entire aneroid means 11 in a counter-clockwise rotation so that the pointer moves negatively the same angular amount that the reference marker 36 moves positively, and by reason of the stationary positioning of gear 20, including the planetary mounting for the ten to one gear train 47, 48, 49, 50 operating pointer 44 from spindle 45, a commensurate ten to one reduced negative movement is imparted to pointer 44 in perfect synchronized accuracy. At the same time that the setting adjustment is being made, there is no interference with the operative functioning of the aneroid means 11 upon the pointers 43 and 44 through the spindle 45.

49 Position No. 2—Gear Functioning

By reason of the fact that the pinion 54 simultaneously engages the teeth of gears 16, 24, and 20, no movement of gear 42 on its shaft 30 is possible, so that it serves as a fixed gripper for internal gear 35, causing internal gear 35 with its reference marker 36, as well as the aneroid means, pointers and scales, and, in fact, all the indicating means, to move as an entirety from the position shown in Fig. 9, for example, into the position shown in Fig. 5. This setting movement is effected also without interfering, during its progress or after its completion, with the operative functioning of aneroid means 11.

Position No. 3—Gear Functioning

In position No. 3, pinion 54 engages solely gears 24 and 20, gear 16 with the rest of the aneroid means being suitably held in fixed position as by frictional engagement with the stationary casing 12.

Gears 24 and 20, being relatively non-rotatable by reason of the simultaneous engagement of their teeth by pinion 54, prevent any rotation of gears 28, 29, and 42 about their axis 30, although they do revolve about the major axis passing through spindle 45 in the angular amount that rotation is imparted to gears 24 and 20. Pinion 29 holds gear 31 against rotation on its axis, although it revolves about the central axis and acts as a gripper for gear 26 carrying the reference element 27. Likewise, the non-rotating gear 42 serves as a gripper for the internal gear 35 carrying reference marker 36. An adjusting setting movement is therefore imparted to reference elements 27 and 36 and dial 32.

50 In addition, the rotation of the planetary mounting 22, 23 carrying the shaft of gears 48 and 49 imparts an adjusting movement to pointer 44 relatively to pointer 43, then stationary by reason of the fact that the aneroid means 11 with its spindle 45 is then stationary, provided the ratio of gear 47 to gear 48 is unequal to the ratio of gear 50 to the pinion 49. Obviously, if such ratios are identical, the planet gears would roll about the two sun gears 47 and 50 without causing any relative rotation between the gear 50 and the gear 47. Such, however, is not the case and the corrective adjustment is effectable by reason of this planetary gear arrangement. This adjusting movement may be effected in either angular direction to impart a relative corrective setting for the elements of the indicating means just enumerated.

Position No. 4—Gear Functioning

It is assumed that the indication of the altimeter is the same as that described for Position No. 1 gear movement, namely, as is shown in Fig. 3, indicating an elevation above sea level of 1,340 feet, and that it is desired to set the altimeter for landing upon a landing field with an elevation of 400 feet above sea level so as to obtain an indication like that shown in Fig. 4.

To effect this setting of the altimeter as was described in connection with Position No. 1, a clockwise rotation was imparted to the finger knob 53. For accomplishing it in this other way, namely that of Position No. 4, a counter-clockwise rotation is imparted to knob 53 and in consequence, a counter-clockwise rotation of pinion 54 results. The counter-clockwise rotation of pinion 54 causes a clockwise rotation of gear 20, now functioning as a planetary journaling for the multiple gear unit 28, 29, and 42 on the same shaft 30, large gears 16 and 24 being held stationary
in a suitable manner by reason of their frictional
51 engagement with the stationary casing 12 at the
portion 19. Gear 28 functioning as a planet gear about central axis 45 and in toothed engagement with the then stationary gear 25 is caused to rotate about its axis 30 in a clockwise direction, and also gears 29 and 42 forming a unit with gear 28. Gear 29 in mesh with gear 31 drives gear 31 counter-clockwise. Gear 31 rotating counter-clockwise in turn drives gear 26 clockwise, and gear 26, carrying the rotary reference member 27, imparts a clockwise setting adjusting movement to the rotary member 27. During this rotation of the reference member 27 clockwise, the pointer 43 has remained stationary relatively to casing 12 by reason of the fixed stationary positioning of the aneroid means 11 but dial 32 with its scale 37 has been rotated clockwise relatively to casing 12, just the angular amount that gear 20 has been rotated, by reason of the fact that it is secured on the hub 22, 23 of this gear 20. However, this clockwise rotation of the dial 32 does not interfere with the setting of the reference marker 36 on scale 37 of dial 32 so as to indicate the 400 foot elevation of the landing field, by reason of the fact that the reference marker 36 is caused by this sun and planet arrangement to travel angularly at twice the angular rate relatively to casing 12 of the rate at which the dial 32 is rotated and likewise clockwise. The proper setting is indicated on the instrument as soon as the reference marker 36 coincides with the major marking 40 of scale 37, although for this second method of setting, the scale indication 4 no longer occupies the position shown in Fig. 4, but has traveled around to the angular position indicated in Fig. 4 by the

position of the mark 8 and the zero of scale 37 has been caused to occupy the position of the mark 4 as shown in
Fig. 4. By this functioning, the negative setting of
52 the pointer 43 relatively to the scale 37 is accom-
plished by moving the scale 37 negatively relatively to the stationary pointer 43 instead of moving the pointer 43 negatively with relation to the scale. This setting adjustment in accordance with position No. 4 not only fixes the position of the reference marker but has caused the pointer 43 to indicate 940 on scale 37.

The clockwise rotation of rotary reference member 27 has now caused a numerical indication of the barometric pressure corresponding to the 400 foot altitude of the landing field to be displayed through window 33. It is to be understood, therefore, that this No. 4 Position setting can be effected by rotating the knob 53 counter-clockwise until the proper barometric pressure corresponding to that at the landing field is indicated through the window 33, provided it is barometric pressure that was obtained as by telephone communication with the landing field instead of foot altitude. Foot altitude makes it convenient to adjust the reference marker 36, whereas barometric pressure at the landing field makes it convenient to set by means of the numeral bearing reference marker 27 shown through window 33.

So far, there has been described the proper relative setting between scale 37, pointer 43, reference marker 36, and reference marker 27. An advantage of this invention in connection with pointer 44 is also present.

The rotation of gear 20 clockwise the equivalent of four major divisions on dial 32 revolves the common planet shaft of gears 48 and 49 clockwise an equal angular amount. By reason of the ten to one ratio in the gear train 47, 48, 49, and 50, this sun and planet functioning effects a counter-
clockwise rotation of the short pointer 44 one-tenth

19

53 of the relative rotation between dial 32 and the long
stationary pointer 43, so as to cause it to indicate the nine-tenths or less than unit indication on scale 37. Thus it is to be seen that both pointers 43 and 44 indicate relatively to the scale 37 by reason of this No. 4 Position

adjustment exactly as they indicate relatively to the scale 37 in Fig. 4. Now, if desired, the knob 53 may be manipulated in Position No. 2 to rotate the entire indicating apparatus and aneroid so as to cause an indication exactly as is shown in Fig. 4.

There has now been described the complete functioning through the medium of Position No. 4 to effect a setting as is indicated in Fig. 4. Obviously, such could not be the case if the shaft for gears 48 and 49 was fixed relatively to the casing 12 or relatively to the aneroid means 11. For the ten to one ratio between pointers 43 and 44, gear 48 divided by gear 47 times gear 50 divided by gear 49 should equal ten.

This setting of the indicating and reference means by moving solely the gear 20 with gears 16 and 24 stationary is therefore the converse or reverse of the action when gears 16 and 24 are rotated and gear 20 is held stationary. Stated differently, this position No. 4 functioning moves the dial 32 relatively to a stationary casing and a stationary pointer 43 and gives a compensating movement for the range pointer 44 and allows the aneroid means 11 to be stationary relatively to the casing 12 while the reference means 36 and 27 are properly set also.

The advantages of the invention as above outlined are best realized when all of its features and instrumentalities are combined in one and the same structure, but useful devices may be produced embodying less than the whole. It

20

will be obvious to those skilled in the art to which 54 this invention appertains, that the same may be incorporated in several different constructions. The embodiments shown and described herein, therefore, are submitted merely as showing preferred exemplifications of the invention. While the invention is applicable to altimeters, it is also applicable as to many of its sub-combination elements, to tachometers, and indicators for stress, flow, air speed, and the like. For example, the housing of all the parts in a single casing providing a clearly visible dial with a large peripheral scale indicating in the decimal system from a plurality of pointers, may have advantage in the construction of many indicators. The pointers 43 and 44 are shown having counter balancing extensions 43′

and 44′. This provision, in addition to the simple type of intergearing of these pointers, tends to make the entire indicator serviceable regardless of the direction and amount of gravitational force or its equivalent, combined gravitational and centrifugal force so often present in air-plane service.

It will be appreciated that various changes and modifications may be made in the device as shown in the drawings, and that the same is submitted in an illustrating and not in a limiting sense, the scope of the invention being defined in the following claims:

21

1. An aircraft measuring instrument comprising
55 a yielding element operated by a varying force, the
intensities of which are to be measured; two dissimilar pointers concentrically rotatable and constrained to rotate in the ratio of ten to one; a single scale graduated in the decimal system and cooperatively concentric with said pointers for the purpose of indicating the said intensities of said varying force; and mechanism operatively connecting both said pointers with said yielding element operatively to rotate said pointers both in the same direction in the ratio of ten to one and in proportion to changes in said varying force.

2. An aircraft measuring instrument comprising a yielding element operated by a varying force, the intensities of which are to be measured; a dial having a circularly arranged scale; two dissimilar pointers pivoted concentric with said scale intergeared to rotate in the predetermined ratio of ten to one and cooperating solely with said scale for purposes of indicating the said intensities of said varying force in the decimal system; and mechanism operatively connecting both said pointers with said yielding element operatively to rotate said pointers both in the same direction in said predetermined ratio of rotation and in predetermined accordance with changes in said varying force.

3. An aeroplane measuring instrument having a casing; a dial for said casing having a marginal circular scale having ten major digits uniformly angularly positioned; a plurality of pointers movable in the ratio of one to ten in concentric cooperation with said scale; and means for rotating said pointers in the said one to ten ratio in response to

something to be measured and indicated whereby quick

22

readings in a plurality of digits in the decimal sys-
56 tem may be made without calculation.

4. An aeroplane measuring instrument having a casing; a dial for said casing having a marginal circular scale having ten major digits uniformly angularly positioned; a plurality of pointers movable in the ratio of one to ten in concentric cooperation with said scale; means for rotating said pointers in the said one to ten ratio in response to something to be measured and indicated whereby quick readings in a plurality of digits in the decimal system may be made without calculation; (and manual means for relatively setting said pointers and said scale.)

5. An aircraft measuring and indicating instrument comprising a yielding element operated by an external varying condition to be measured and indicated; a plurality of dissimilar pointers concentrically rotatable and constrained to rotate in the ratio of ten to one; a dial having a single scale graduated in the decimal system and cooperatively concentric with said pointers for the purpose of indicating the movements of said yielding element; mechanism operatively connecting said pointers with said yielding element operatively to rotate said pointers in the same direction in the ratio of ten to one and in response to changes in said yielding element; and an enclosing casing operatively housing all the parts for operation regardless of the direction of the force of gravity.

6. An aircraft measuring and indicating instrument comprising a yielding element operated by an external varying condition to be measured and indicated; a plurality of dissimilar pointers concentrically rotatable and constrained to rotate in the ratio of ten to one, one of which is counterbalanced; a dial having a single scale graduated in the

23

decimal system and cooperatively concentric with
57 said pointers for the purpose of indicating the move-
ments of said yielding element; mechanism operatively connecting said pointers with said yielding element operatively to rotate said pointers in the same direction in the ratio of ten to one and in response to changes in said

yielding element; and an enclosing casing operatively housing all the parts for operation regardless of the direction of the force of gravity, and exposing said pointers and said scale for clear visibility.

Add
A'7 PAUL KOLLSMAN

58 *Oath*

County of New York,
State of New York, ss:

Paul Kollsman, the above named petitioner, being duly sworn, deposes and says that he is a citizen of the United States and a resident of the Borough of Manhattan, County, City and State of New York, and that he verily believes himself to be the original, first and sole inventor of the improvement set forth and claimed in the foregoing specification for which improvement he solicits a patent; that deponent does not know and does not believe that said improvement was ever before known or used; that deponent verily believes that the Letters Patent referred to in the foregoing petition and specification and surrendered in connection with the petition accompanying his application filed October 27, 1932, Serial No. 639,897, are inoperative for the reason that the specification thereof is defective and insufficient, and that such defect and insufficiency consist particularly in the fact that a clear description in easily understandable English was not embodied in the specification, although the drawings were accurate, and after painstaking study an understanding of what was intended to be disclosed was present, and further in that the claims were in many instances too broad and in other instances unnecessarily limited, and further that in some instances what was shown in the drawings was inaccurately described, and further in that what was obviously shown in the drawings was not described in words; and deponent further says that the errors which make such patent so inoperative arose from inadvertence and mistake, particularly in view of the fact that your deponent,
59 although he understands technical matters thoroughly, was forced to rely upon the representations of his attorney as to the form in which application for pat-

ent could be made, and without any fraudulent or deceptive intention on the part of deponent; that the following is a true specification of the errors which it is claimed such inadvertence and mistake relied upon, namely: the operation of the indicator should have been described in true accord with the original drawings, which was not the fact; various names for the same elements of the invention should not have been employed; and in general, the description of the invention should have been in sufficiently simple and straightforward language as to make the same understandable to persons of reasonable intelligence; that such errors so particularly specified arose and occurred as follows, namely: your deponent was informed by his attorney that the terminology and language employed were such as required by the laws of the United States, and although your deponent spent days in attempting to understand the terminology of his original patent, he was truly unable to grasp and understand whether or not his invention had been set forth clearly and simply and had been so claimed.

PAUL KOLLSMAN

Sworn to and subscribed before me this 6 day of January, 1934.

CHAS. BEHRMAN
Notary Public, Queens County 106
Queens County Register No. 1368
N. Y. County Clerk's 1106, Register 48741
Kings County Clerk's 260, Register 4299
Term Expires March 30, 1934

(Seal)

64 Paper #2

Mail Division Feb-3 34 U. S. Patent Office A
MWC

In the United States Patent Office

Division: 36
Applicant: Paul Kollsman
Ser. No.: 705,642
Filed: January 8, 1934
For Quick Reading Indicator

38 Park Row
New York, N. Y.
February 2, 1934

Hon. Commissioner of Patents
Washington, D. C.

Sir:

Kindly add the following claim, which is a copy of claim 37 in my original patent No. 1,857,311:

7. An altimeter having a scale, an indicator, a plurality of pointers movable in the ratio of one to ten by the indicator, said pointers being coordinated with said scale, and the indicator and scale being rotatable relatively to each other.

Remarks

Kindly instruct me when I may expect an action in the above-entitled application.

Attention is respectfully called to Rule 63, Sub-division b.

Respectfully,

LEONARD DAY
LD:J *Attorney for Kollsman*

71 #6

May-9-34 203340 K-Check— 15.00

Mail Division May-9 34 U. S. Patent Office

In the United States Patent Office

Div. 36, Room 7628
Applicant: Paul Kollsman
Ser. No.: 705,642
Filed: Jan. 8, 1934
For Quick Reading Indicator
Docket 3064

38 Park Row
New York, N. Y.
May 8, 1934

Appeal

Hon. Commissioner of Patents
Washington, D. C.

Sir:

And now comes the applicant, Paul Kollsman, by his attorney, Leonard Day, and respectfully appeals to the Board of Appeals from the decision of the Primary Examiner dated March 29, 1934 in his above-entitled application. The reasons for the appeal are as follows:

1. The Examiner erred in rejecting Claims 1 to 6 for the alleged "reason that they cover the same subject matter as included in Claim 13 of applicant's original application and which was deliberately cancelled".
2. The Examiner erred in rejecting Claims 1 to 7 as unpatentable over Eremeeff.
3. The Examiner erred in rejecting Claims 1 to 7 as unpatentable over Eremeeff in view of Rasch.
4. The Examiner erred in rejecting Claim 7 on the ground of double patenting.
5. The Examiner erred in not allowing each of the claims numbered 1 to 7.

The appeal fee of $15.00 accompanies this appeal and an oral hearing is prayed.

Respectfully,

LEONARD DAY
Attorney for Kollsman

LD:J

Endorsed: Board of Appeals May 10 1934 U. S.
Patent Office

38

72 Paper #7

Mailed May 22 1934

United States Patent Office
Washington, D. C.

Before the Board of Appeals on Appeal filed May 9, 1934.

In re application of Paul Kollsman, Serial No. 705642

Filed Jan. 8, 1934 For Quick Reading Indicator

Examiner's Statement

The applicant has appealed from the final rejection of claims 1 to 7 inclusive, which are all the claims in the case. The claims are as follows:

1. An aircraft measuring instrument comprising a yielding element operated by a varying force, the intensities of which are to be measured; two dissimilar pointers concentrically rotatable and constrained to rotate in the ratio of ten to one; a single scale graduated in the decimal system and cooperatively concentric with said pointers for the purpose of indicating the said intensities of said varying force; and mechanism operatively connecting both said pointers with said yielding element operatively to rotate said pointers both in the same direction in the ratio of ten to one and in proportion to changes in said varying force.

2. An aircraft measuring instrument comprising a yielding element operated by a varying force, the intensities of which are to be measured; a dial having a circularly arranged scale; two dissimilar pointers pivoted concentric with said scale, intergeared to rotate in the predetermined ratio of ten to one and cooperating solely with said scale for purposes of indicating the said intensities of said varying force in the decimal system; and mechanism operatively connecting both said pointers with said yielding element operatively to rotate said pointers both in the same direction in said predetermined ratio of rotation and in predetermined accordance with changes in said varying force.

3. An aeroplane measuring instrument having a casing; a dial for said casing having a marginal circular scale having ten major digits uniformly angularly positioned; a plurality of pointers movable in the ratio of one to ten in concentric cooperation with said scale; and means for rotating

said pointers in the said one to ten ratio in response to something to be measured and indicated whereby quick readings in a plurality of digits in the decimal system may be made without calculation.

4. An aeroplane measuring instrument having a casing; a dial for said casing having a marginal circular scale having ten major digits uniformly angularly positioned; a plurality of pointers movable in the ratio of one to ten in concentric cooperation with said scale; means for rotating said pointers in the said one to ten ratio in response to something to be measured and indicated whereby quick readings
in a plurality of digits in the decimal system may be
73 made without calculation; and manual means for rel-

39

atively setting said pointers and said scale.

5. An aircraft measuring and indicating instrument comprising a yielding element operated by an external varying condition to be measured and indicated; a plurality of dissimilar pointers concentrically rotatable and constrained to rotate in the ratio of ten to one; a dial having a single scale graduated in the decimal system and cooperatively concentric with said pointers for the purpose of indicating the movements of said yielding element; mechanism operatively connecting said pointers with said yielding element operatively to rotate said pointers in the same direction in the ratio of ten to one and in response to changes in said yielding element; and an enclosing casing operatively housing all the parts for operation regardless of the direction of the force of gravity.

6. An aircraft measuring and indicating instrument comprising a yielding element operated by an external varying condition to be measured and indicated; a plurality of dissimilar pointers concentrically rotatable and constrained to rotate in the ratio of ten to one, one of which is counterbalanced; a dial having a single scale graduated in the decimal system and cooperatively concentric with said pointers for the purpose of indicating the movements of said yielding element; mechanism operatively connecting said pointers with said yielding element operatively to rotate said pointers in the same direction in the ratio of ten to one and in response to changes in said yielding element; and an enclosing casing operatively housing all the parts for opera-

tion regardless of the direction of the force of gravity, and exposing said pointers and said scale for clear visibility.

7. An altimeter having a scale, an indicator, a plurality of pointers movable in the ratio of one to ten by the indicator, said pointers being coordinated with said scale, and the indicator and scale being rotatable relatively to each other.

The references relied upon for rejection are:

Eremeeff,	1,676,983,	(73-4)
Rasch, (Fr. pat.)	475,931,	(73-37)
Kollsman,	reissue 19,079,	(73-4)

The claims are directed to a measuring instrument comprising, a yielding element (an aneroid of a barometer or altimeter) operated by a varying force (atmospheric pressure) the intensity of which is to be measured. Two dissimilar pointers are concentrically rotatable mounted and constrained to move in the ratio of ten to one. The pointers in the drawing are designated by the reference characters 43 and 44. Pointer 43 is mounted on a shaft
74 45 which is operatively connected to the yielding ele-

40

ment (aneroid) through conventional mechanism. Pointer 44 is mounted on a hollow or tubular shaft or hub 46. The shaft 45 extends through the tubular shaft 46 whereby the pointers are concentrically mounted. Interconnecting the two shafts is a gear train consisting of gear 47 secured to shaft 45 which engages the gear 48 mounted on a counter shaft also carrying gear 49, the latter of which engages the gear 50 secured to the tubular shaft 46. The gear ratios of this gear train are such that the pointers are movable in the ratio of ten to one. A single scale 37 graduated with ten major digits is cooperatively concentric with said pointers for the purpose of indicating the intensity of the varying force. The purpose of having two concentrically rotatably mounted dissimilar pointers rotatable in the ratio of ten to one is to have one pointer make ten revolutions to one revolution of the other thereby having one pointer move at a much higher rate of speed than the other in response to movements of the yielding element (aneroid). For example, one revolution of the high speed pointer may represent 1000 feet altitude and one revolution of the slow speed pointer may represent 10,000 feet altitude. The purpose of having a single scale graduated in ten major digits is to facilitate reading the pointers movable thereover. For example, if the slow speed pointer (the short pointer 44) registers somewhere between "2" and "3" digits on the single scale and the high speed pointer (the long pointer 44) registers "5", a glance at the pointers instantly indicates 2500 feet. This registration instantly indicates altitude in accordance with the decimal system with the accuracy of a sensitive pointer and all the necessary range of a slow speed pointer.

Claims 1 to 6 inclusive were rejected for the reason that they cover the same subject matter as included in
75 claim 13 of applicant's original application and which

41

was deliberately cancelled in order to obviate the art cited there-against and obtain a patent. Hence, there was no inadvertence that would entitle applicant to these claims under a reissue. Ex parte Hoiland, 285 O. G. 391. It is true in this case, as the Court remarked in ex parte Hoiland, that "the canceled claims were not precisely the same in scope as claims 1 to 7 (viz. the claims canceled in the original application) but they were for substantially the same invention, and having deliberately canceled claims to this subject matter applicant is not in a position to now assert that there has been an inadvertence, accident or mistake such as will suport a reissue".

Original claim 13 was drawn to "an altimeter having a plurality of pointers, a common scale therefor, and means for moving the pointers in the ratio of ten to one". This claim was withdrawn in favor of another claim (38) which recited the 10 to 1 pointer ratio, but this was, so far as patentability of the substitute claim was concerned, mere surplusage, for the 10 to 1 ratio was not relied upon for patentability, nor did it lend patentability to the new claim, but the patentable matter of the substitute claim 38 resided in the provision of the *reference means movable relative to the dial, the plurality of dials,* and the scales thereon increasing in *opposite* directions. This is all apparent and emphasized in the argument accompanying the substitute claim 38.

Now it is apparent at a glance that the proposed reissue claims 1 to 6 have more words than the original claim 13

which was withdrawn but the new claims include nothing more than an increase in words over original claim 13, or simply tag in and elaborate upon elements which all alti-
meters have and necessarily must have. For instance
76 claim 1 introduces the yielding element, which is the

42

aneroid, capsule, bellows or collapsible unit present in every altimeter ever made of the aneroid type. The next element introduced in the claim not specifically recited in original claim 13 is the transmission from aneroid or pressure responsive element to pointers, and here again we have but a positive recitation of a structure necessary and implied in canceled claim 13. Anyone who should produce an altimeter without having a yielding or atmospheric pressure responsive element and/or transmission therefrom to the pointers would contribute something revolutionary indeed.

The remaining claims may be similarly analyzed. Claim 3 for instance adds a casing for the altimeter. The Examiner has never heard of one not being housed. In fact throughout the gamut of measuring instruments casings are recognized essentials.

As stated in ex parte Hoiland above, the canceled claim to bar allowance in a reissue need not be "precisely the same" as in the reissue, but only of "substantially the same" scope; ex parte White, 366 O.G. 697 is to the same effect. Later, in Rim Co. v. Firestone, 381 O. G. 3 the Circuit Court of Appeals for 6th Circuit, in a case involving the question here presented held that cancelation of an original claim does not prevent reissue to obtain a "more limited and therefore different claim". The Court held that there must be a "materially different" claim, and the Court emphasized, "is not to be found merely in a choice of words, which may not imply a different, nor in *trifles,* which may not be material". It seems to the Examiner as a corallary to the Court's remarks about "trifles", that even the inclusion of an essential element of an altimeter with the view of lending patentability to a reissue claim is in effect only a "trifle" where that element is conventional, and rec-
ognized and implied as a necessary unit of all alti-
77 meters. It is but a subterfuge to make a claim look

43

different and read differently, to cover the same concept. The applicant had just as well revamped claim 13 to recite that the device is made of metal.

(2) Claims 1 to 7 inclusive were further rejected as unpatentable over Eremeeff. Eremeeff shows it to be old to mount two dissimilar pointers concentrically to rotate in the ratio of four to one over a single scale graduated in ten major digits. The pointers are interconnected by a gear train which in turn is operatively connected to an aneroid. It is held not to involve invention to change the ratio of rotation of the pointers, if so desired. All that would be required to accomplish this result is the changing of the gear ratios of the gears rotating the two pointers. This would come within the skill of a mechanic.

(3) Claims 1 to 7, inclusive were still further rejected as unpatentable over Eremeeff in view of Rasch. Eremeeff shows it to be old to mount two dissimilar pointers concentrically to rotate in a given ratio. Rasch shows it to be old to provide for a plurality of concentrically mounted pointers rotatable in the ratio of ten to one. Therefore, it is held not to be a matter of invention to adopt a gear ratio for the gear train for rotating the pointers of Eremeeff to cause the pointers to move in the ratio of ten to one the same as Rasch has done.

(4) Claim 7 stands further rejected on the ground of double patenting, the subject matter of this claim being indivisible from claim 37 of applicant's reissue patent 19,079.

This claim, while not regarded as patentable per se, as indicated above, is a verbatim copy of claim 37 of the original patent. It should be noted that in applying for reissue applicant divided his original patent, upon his own motion,
into three reissue applications. One has resulted in

44

78 reissue patent 19,079, and the instant application is
the/another of the applications.

In the reissue application resulting in patent 19,079 applicant has patented as claim 37 an organization very nearly the same as claim 7 of this application (viz. original patent claim 37). Claim 37 of reissue patent 19,079 recites the indicator, pointers, and setting means. Claim 7 of this application likewise recites the indicator and pointers, and that the indicator and scale are "rotatable relatively to each other", which is for the purpose of setting. It should be remarked also, that both claim 37 of the patent 19,079, and claim 7 of this application are generic and cross read, and that they are both based upon identical disclosures. There is, then, but one invention and no room for division. There being but one invention there can be but one patent.

The Examiner is not unmindful of the fact that all divisions of a reissue expire at the same time, and thus the allowance of overlapping claims of this nature will not literally extend the monopoly; but at best such divisions can only lead to confusion and have no basis in law or reason. It may be true that a patent issued with, say 10 claims, to a single invention, if reissued at 10 separate patents each with one of the claims, would not extend the monopoly, but it would confuse the monopoly and the records of this office.

Respectfully submitted,

A D McFADYEN
Kampe:mwc *Examiner, Div. 36.*

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87 Appeal No. 11869 Paper No. 12
Decision

Endorsed: U. S. Patent Office Board of Appeals
Mailed Sep 20 1934

Appeal No. 11,869
Hearing: September 6, 1934 REH

In the United States Patent Office

Before the Board of Appeals

Ex parte Paul Kollsman

Application for Patent filed January 8, 1934, Serial No. 705,642 for the reissue of Patent No. 1,857,311 granted May 10, 1932. Quick Reading Indicator.

Mr. Leonard Day for applicant.

This is an appeal from the action of the primary examiner finally rejecting claims 1-7 inclusive.

Claim 1 is representative of the subject matter involved.

1. An aircraft measuring instrument comprising a yielding element operated by a varying force, the intensities of which are to be measured; two dissimilar pointers concentrically rotatable and constrained to rotate in the ratio of ten to one; a single scale graduated in the decimal system and cooperatively concentric with said pointers for the purpose of indicating the said intensities of said varying force; and mechanism operatively connecting both said pointers with said yielding element operatively to rotate said pointers both in the same direction in the ratio of ten to one and in proportion to changes in said varying force.

The references relied upon by the examiner are:

54

88	Rasch (French),	475,931,	Apr. 6, 1915,
	Eremeeff,	1,676,983,	July 10, 1928,
	Kollsman,	Re. 19,079,	Feb. 13, 1934.

This application relates to the use of an aircraft instrument having a single scale for cooperation with two pointers arranged to travel at a ratio of 1:10.

The patent to Eremeeff discloses a similar instrument in which the pointers travel at a ratio of 1:4. The French patent shows a gas measuring instrument in which pointers travel at the 1:10 ratio. In this patent scales are provided for each pointer.

We are convinced that it would not involve invention to employ a single scale for all of the pointers in the French patent and we also believe that it would be obvious to employ the 1:10 ratio in the Eremeeff instrument. If any suggestion was necessary in modifying the latter instrument, we consider that the disclosure of the French patent is pertinent even though the measuring instrument of that patent is not intended to be used for measuring a varying force on an airplane.

Claims 1-6 have been rejected as not patentably distinguishing from claim 13 which was canceled in the original application of which this application is a reissue. Appealed claim 7 was allowed in the original patent and while somewhat more specific than the canceled claim 13, we believe that it is at least as broad as any of the other claims involved in this appeal. It is our opinion, therefore, that appellant is not estopped as to the remaining claims by his cancellation of the original claim 13.

53

89 Claim 7 is also rejected as substantially of the same nature as claim 37 in appellant's granted reissue. This claim 37 contains a limitation with regard to a setting means which is not found in appealed claim 7 and we consider that it should not be assumed that this limitation is immaterial in a patent claim. It is our view that claim 7 should not be rejected for this reason.

The decision of the examiner is affirmed in holding that the subject matter of all of the appealed claims is unpatentable over the art and his decision is reversed as to the other grounds of rejection.

BOARD OF APPEALS
LESLIE FRAZIER
Assistant Commissioner
W. L. REDROW,
Examiner-in-Chief
W. L. THURBER
Examiner-in-Chief

September 20, 1934

56

90 Docket Division Oct 9-1934 U. S. Patent Office
Mail Division Oct 9 34 U. S. Patent Office
Board of Appeals Oct 9 1934 U. S. Patent Office

In the United States Patent Office

Before the Board of Appeals

Div. 36 Room 7628
Applicant: Paul Kollsman
Ser. No.: 705,642
Filed: January 8, 1934
For Quick Reading Indicator
Docket: 3064

Petition for Reconsideration

Now comes Paul Kollsman by his attorney Leonard Day and respectfully petitions that this Honorable Board give reconsideration to that part of its decision dated September 20, 1934 holding claims 1 to 7 as lacking in invention over the United States Patent to Eremeeff 1,676,983 and the French Patent to Rasch 475,931.

In connection with its reconsideration this Honorable Board is respectfully requested to consider the fact that neither of the references relied upon are in the same art of airplane instruments such as altimeters to which the claims are limited. This Honorable Board is also respectfully requested to reconsider the offer of the undersigned made on the argument of the appeal to supply affidavits from leading pilots setting forth the merits of the Kollsman invention and in fact setting forth substantially revolutionized readiness in the reading of airplane instruments occasioned by the Kollsman invention.

Also, in connection with its reconsideration, this Honorable Board is specifically requested to give further consideration to the case of Otto v. Robertson, Commissioner of Patents, decided June 26, 1933, 432 O. G. 757, 66 F 2nd 213 1933 C. D. 24.

91 In this case the ease in reading the deviation of a ship's compass was substantially all the novelty and this ease was brought about by a known number display device, there being nothing new but the combination. It is believed that the subject on appeal is on its face even more obviously novel and useful than was that found patentable by the Circuit Court of Appeals of the District of Columbia, cited above.

Respectfully,

LEONARD DAY
Attorney for Kollsman

LD/M

New York, N. Y.,
October 6, 1934

92 Appeal No. 11,869 Paper No. 14
Decision.

U. S. Patent Office Board of Appeals Mailed Oct 22 1934

Appeal No. 11,869 REH

In the United States Patent Office

Before the Board of Appeals

Ex parte Paul Kollsman

Application for Patent filed January 8, 1934, Serial No. 705,642 for the reissue of Patent No. 1,857,311 granted May 10, 1932. Quick Reading Indicator.

Mr. Leonard Day for applicant.

Petition for Reconsideration

Appellant petitions for reconsideration in the appeal decided September 20, 1934.

He particularly calls our attention to the fact that the references are not airplane instruments, that he offered to supply affidavits from leading pilots to show the revolutionary nature of the change when applied to airplane instruments and also that a certain decision, cited by him, he regards as particularly pertinent with respect to this appeal.

We have not questioned the advantage which flows from
the use of appellant's dial with airplane instruments
59
93 but in view of the state of the art, we were forced to
the conclusion that appellant's contribution was an obvious one. If his quick-reading dial is not patentable when employed on the ground, we are convinced that it does not become so when taken into the air, merely because the importance of quick-reading is greater.

As to the cited decision, of course each case must rest upon its own merits and we are not convinced that the Court which decided the case referred to would have found the matter claimed in this appeal patentable in view of the state of the art. We note that the Court stated that the art relied

1934

CONTENTS

Application .... *papers:*

1. Amnt 1-8-34
2. Amndt A Feb 3 34
3. Rejection MAR 10 1934 R
4. Letter Mar 21-34
5. Rejection MAR 29 1934 R
6. Appeal May-9-34
7. MAY 22 1934
8. HEARING JUL 18 1934
9. REQUEST TO POSTPONE HEARING July 17/34
10. [illegible] postponed to Sept. 6/34
11. BRIEF SEP 6 - 1934
12. DECISION BY BOARD SEP 20 1934
13. [illegible] Oct 9/34
DECISION BY [illegible] OCT 22 1934
14.
15. Notice of Suit under Sec. 4915 R.S. - April 15 - 1935
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18. Not up for Action
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Inv. 11 869

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705642

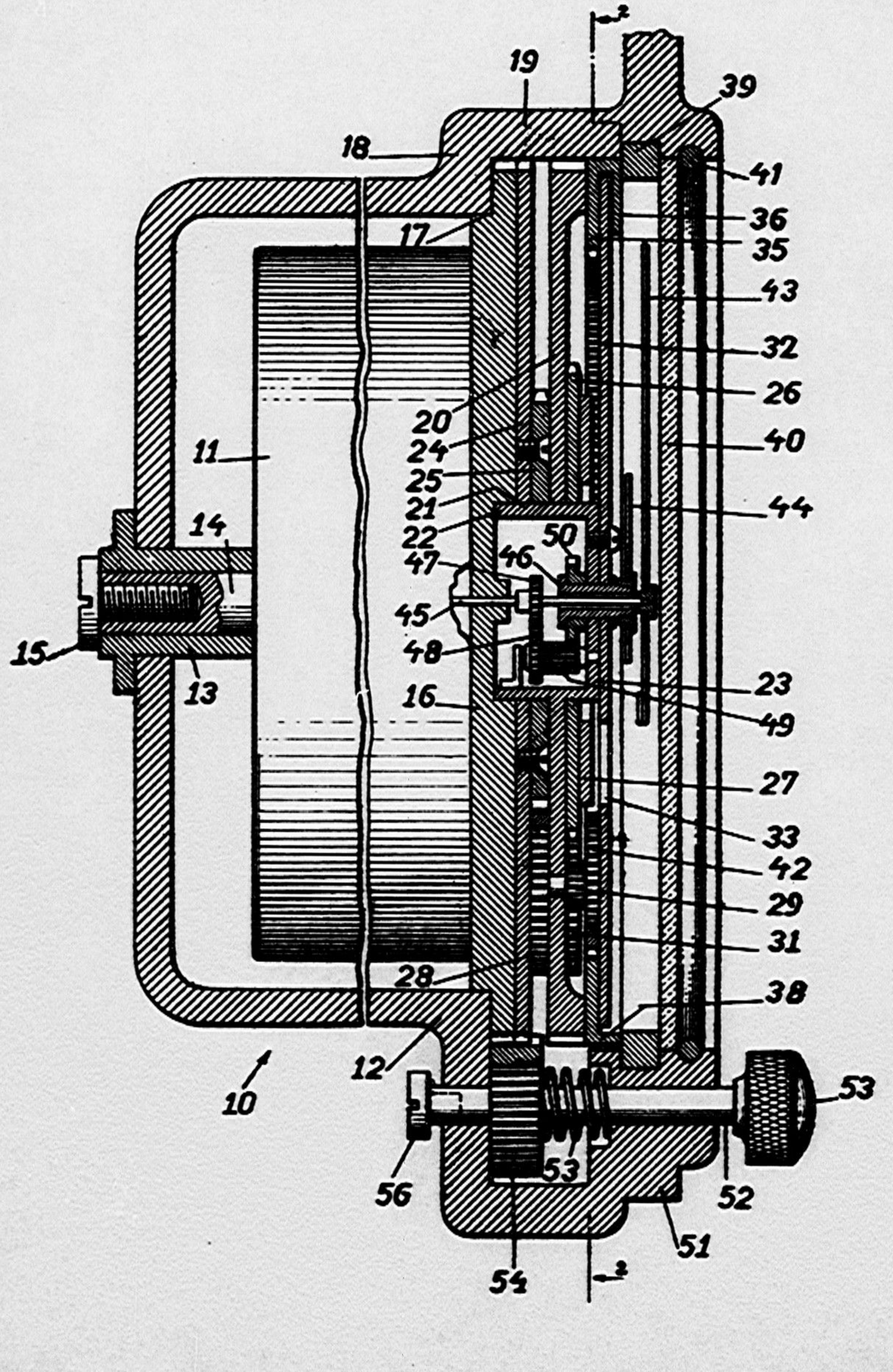


FIG. 1

INVENTOR
PAUL KOLLSMAN
BY
ATTORNEY

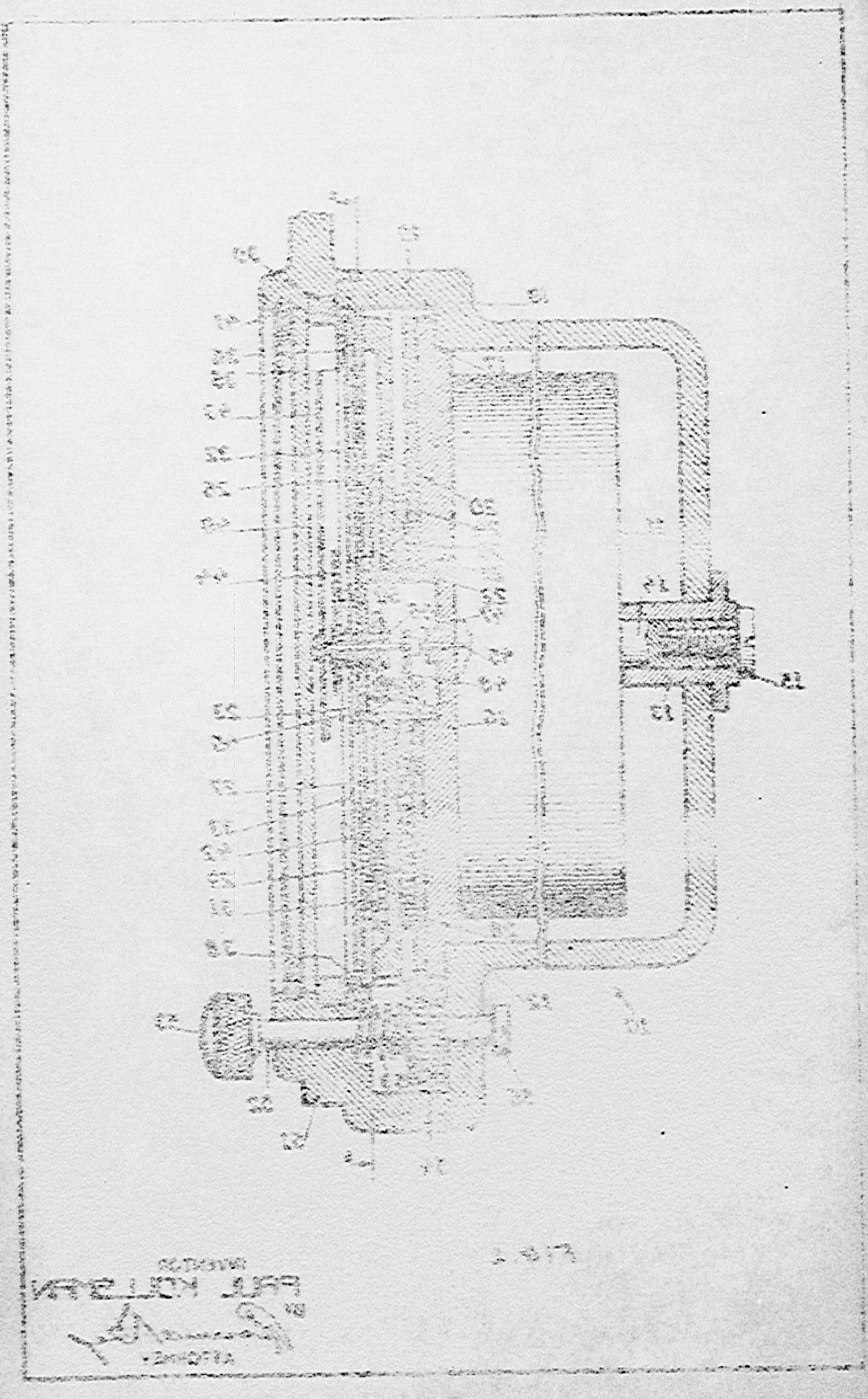


FIG. 1
PAUL KOLLSMAN
INVENTOR
BY
ATTORNEY

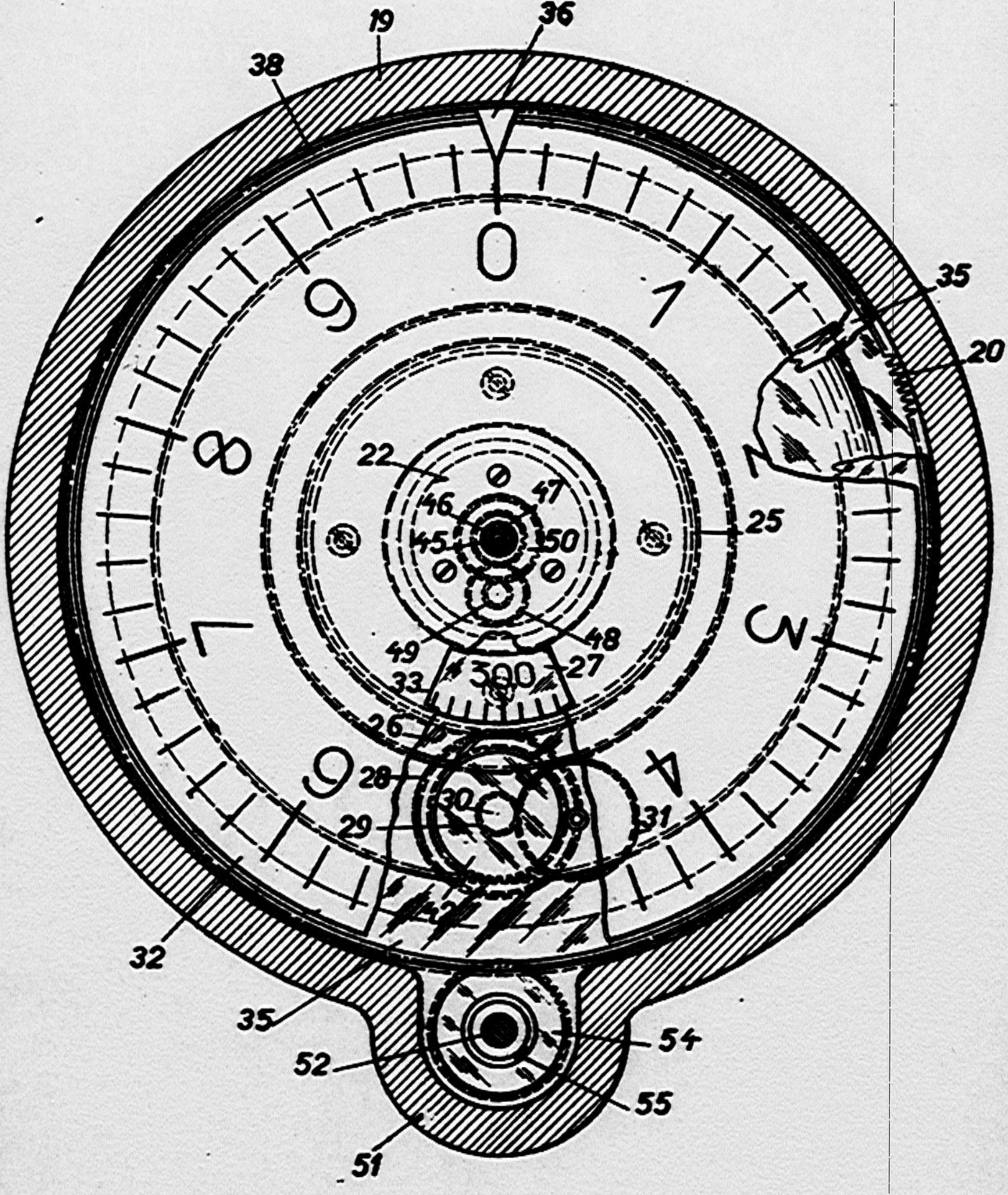


FIG. 2

INVENTOR
PAUL KOLLSMAN
BY
ATTORNEY

705642

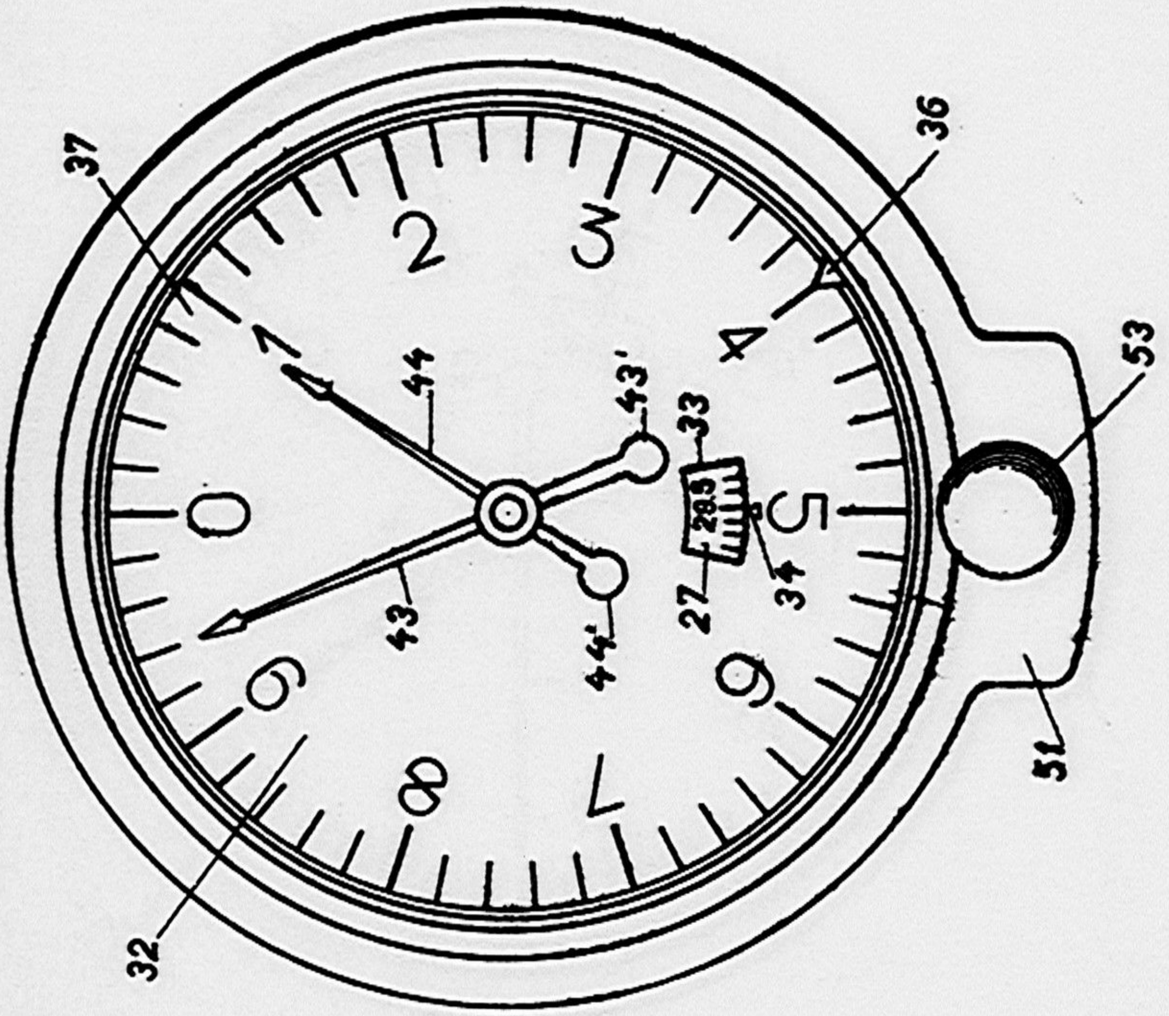


FIG. 4

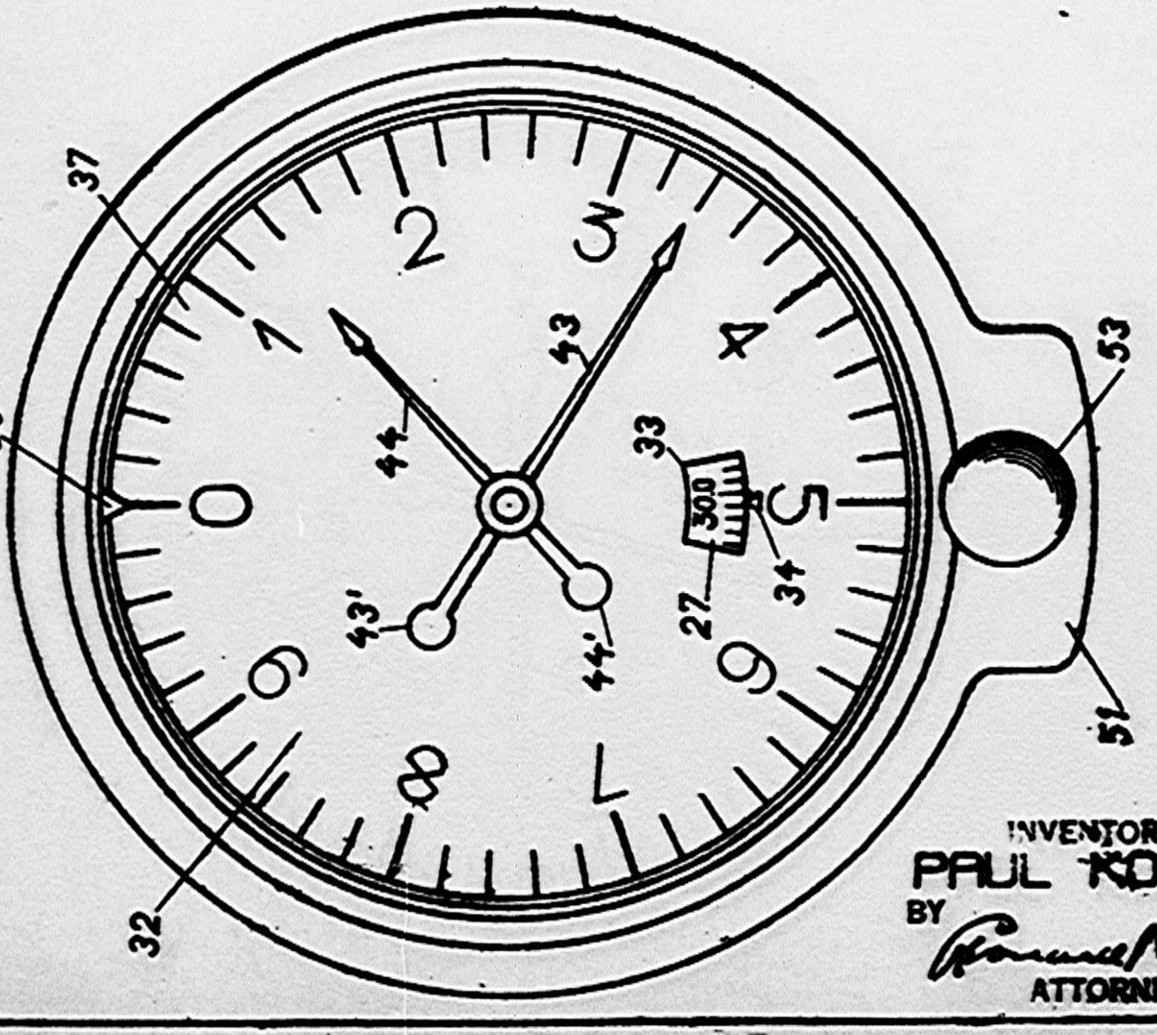
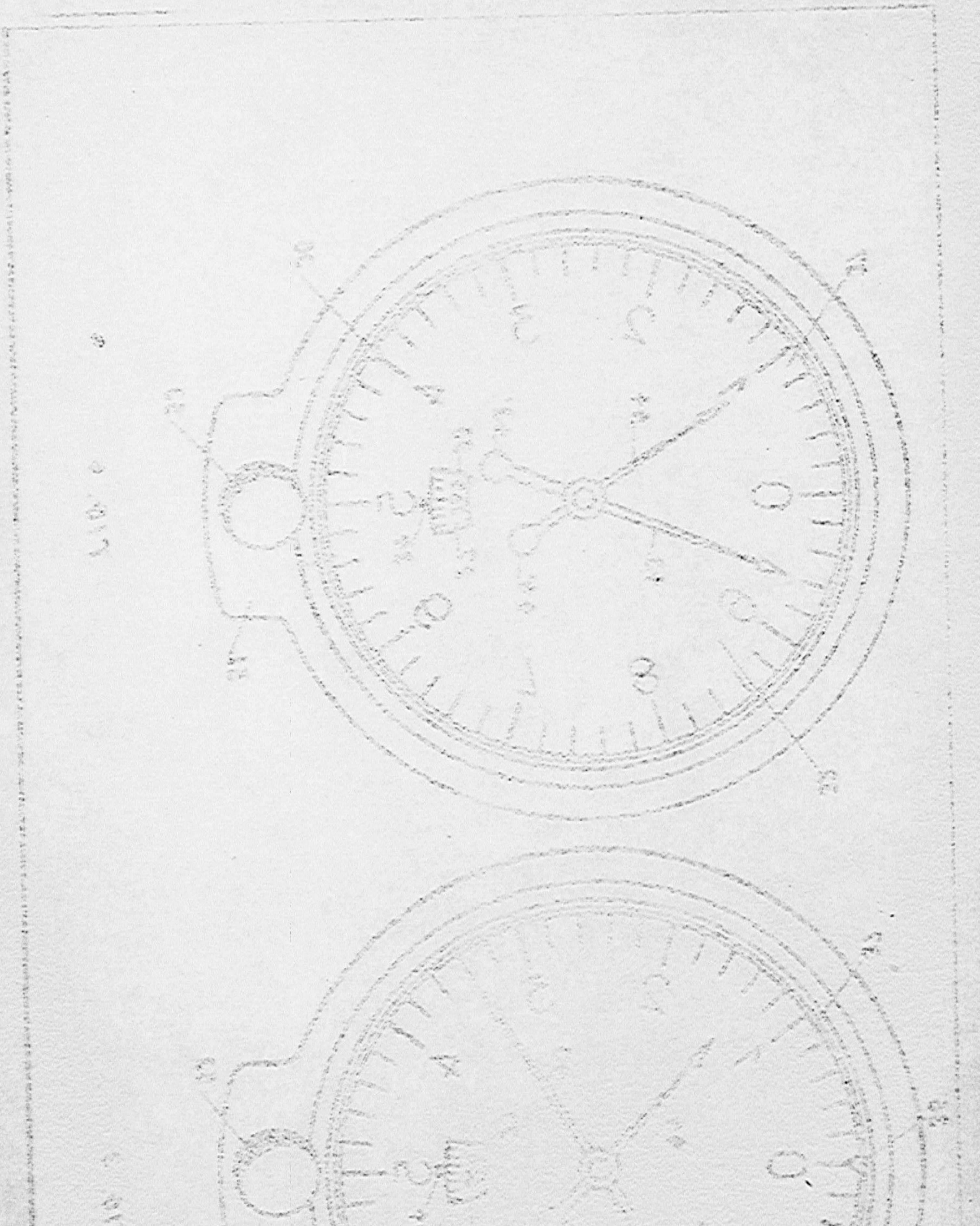


FIG. 3

INVENTOR
PAUL KOLLSMAN
BY
ATTORNEY



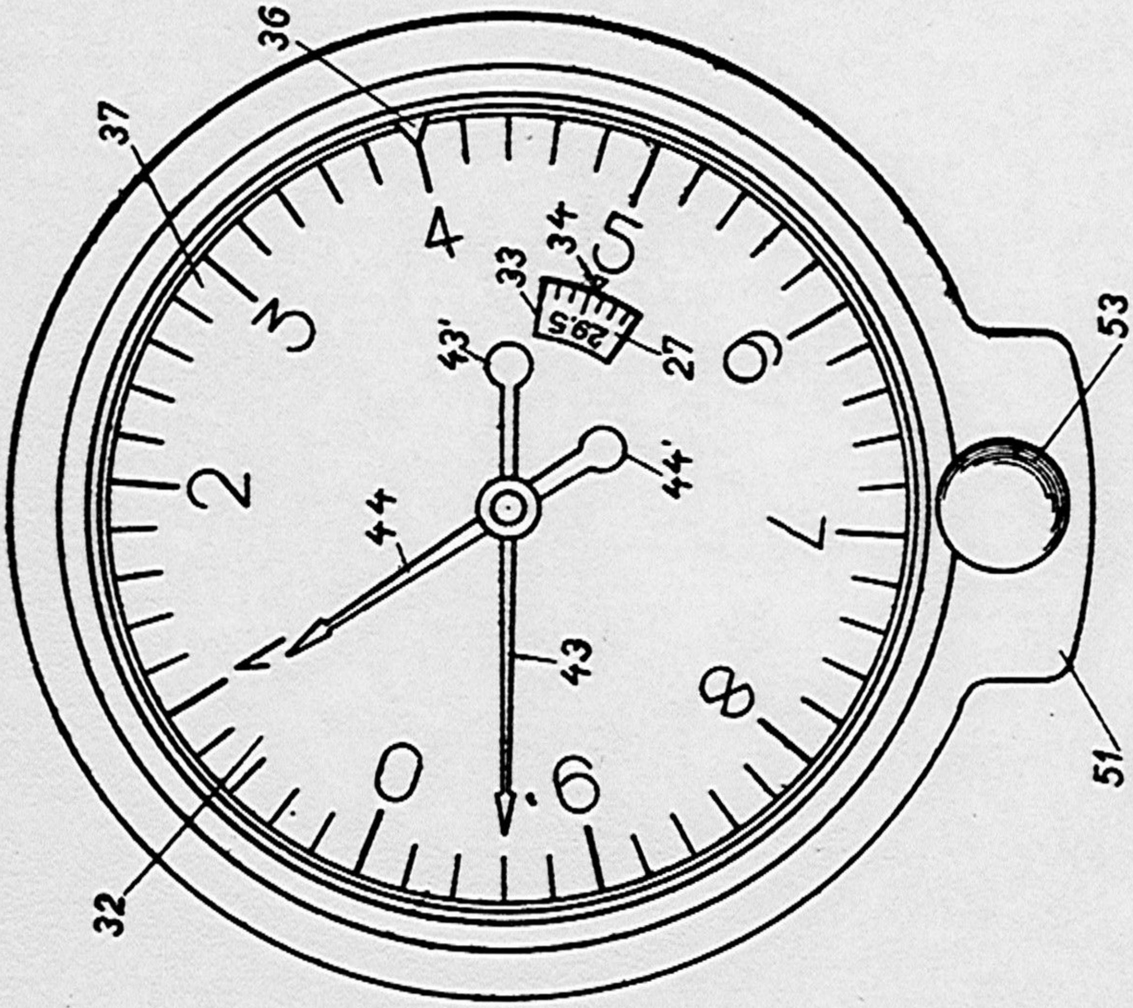


FIG. 6

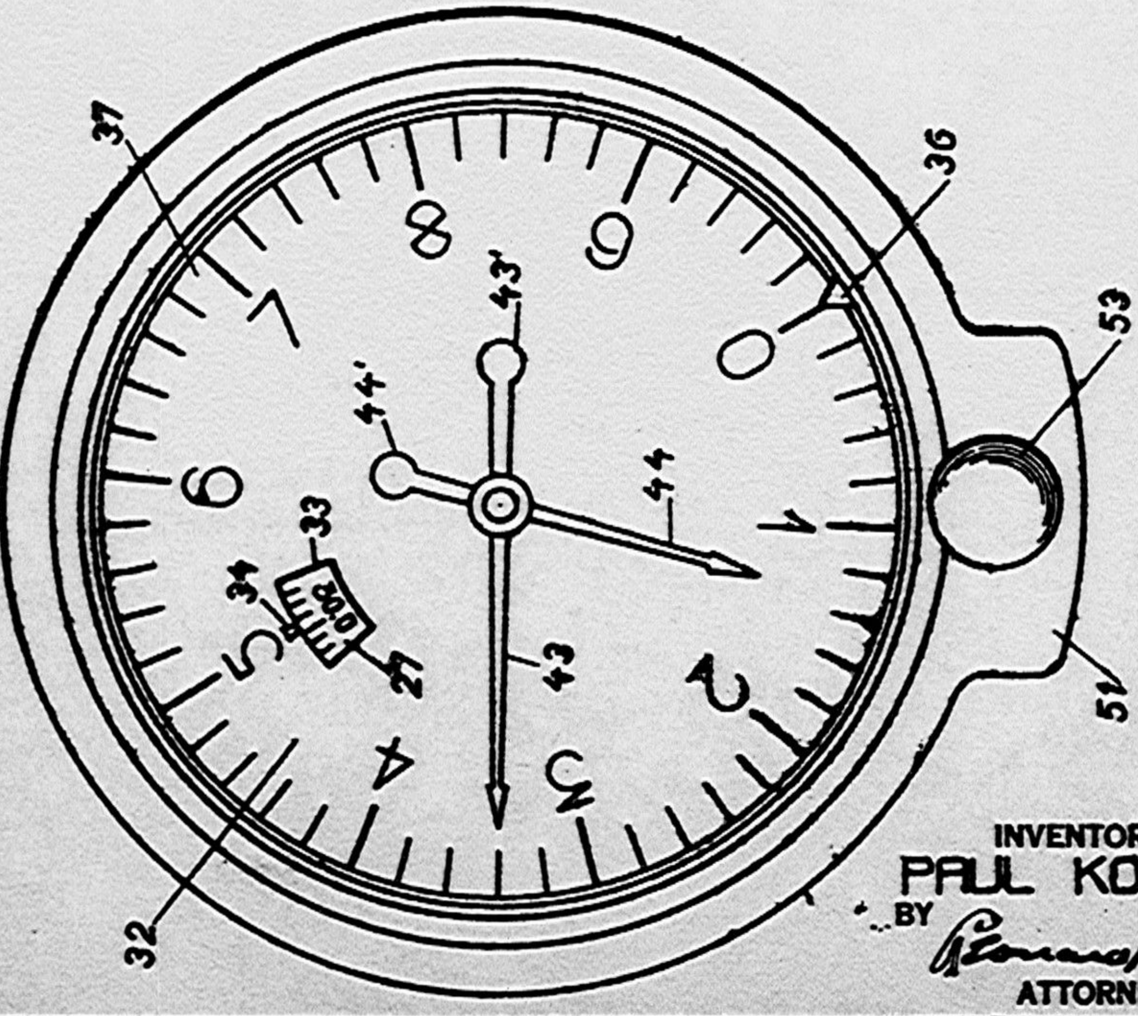


FIG. 5

INVENTOR
PAUL KOLLSMAN
BY
ATTORNEY

upon by the examiner was non-analogous and in our opinion the dials on the measuring instruments cited here would be regarded as analogous by those skilled in the measuring art. We think it highly probable that the Court would not make the same statement with respect to the relationship of the arts in the situation before us. There are also various other statements to be found in the decision which we believe indicate that the Court may have been influenced by facts and conditions which are not the same in this case.

We are still of the opinion that the position taken by us was the proper one and the petition is therefore denied.

LESLIE FRAZIER
Assistant Commissioner

W. L. REDROW,
Examiner-in-Chief

W. L. THURBER
Examiner-in-Chief

BOARD OF APPEALS

October 22, 1934

60

(Here follows photostats marked pages 95 to 99.)

KOLLSMAN VS. COE.

Equity No. 58,618

A—Eremeef,		1,676,983
B—Munnell,		309,240
C—Rasch,	French,	475,931
D—Zang et Cie,	French,	557,424
E—Compagnie pour la Fabrication etc.	Swiss,	51,663
F—Prints of Drawings.		
G—Examiner's Statement.		
H—Decision of Board of Appeals.		
I—Decision of Board of Appeals on Petition for Rehearing.		

July 10, 1928. **1,676,983**

I. I. EREMEEFF

BAROMETRIC DEVICE

Filed July 23, 1921 2 Sheets-Sheet 1

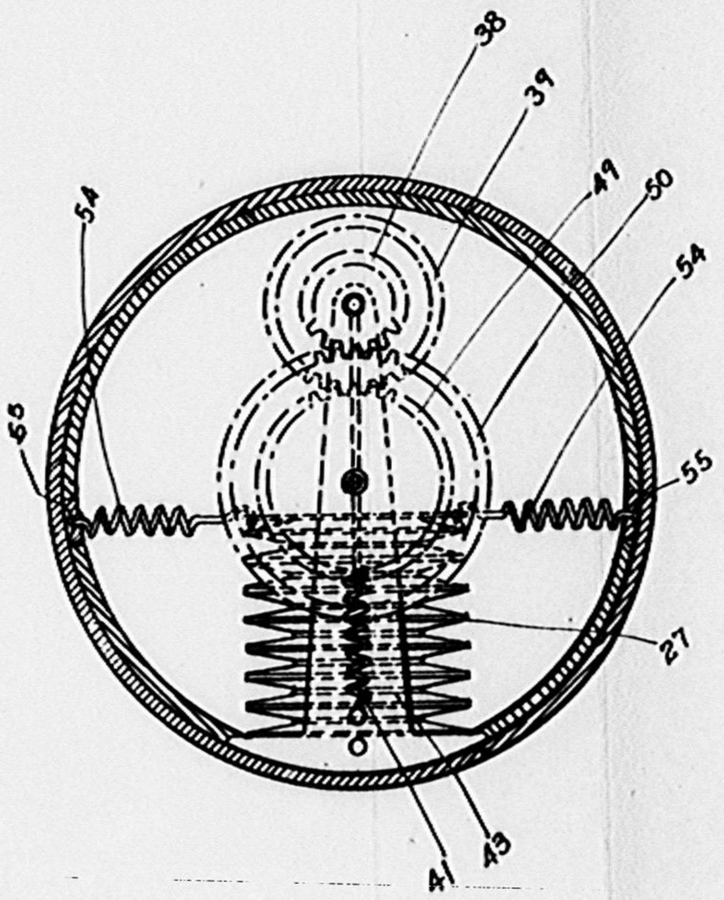


Fig. 3.

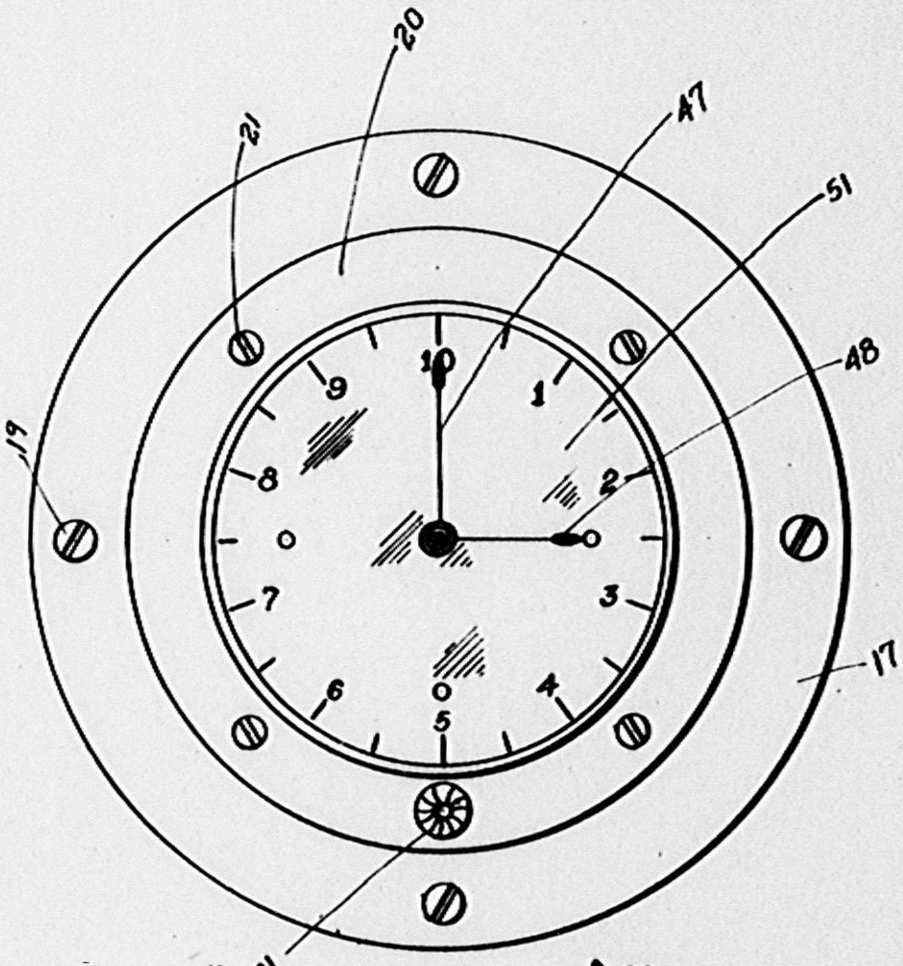


Fig. 2.

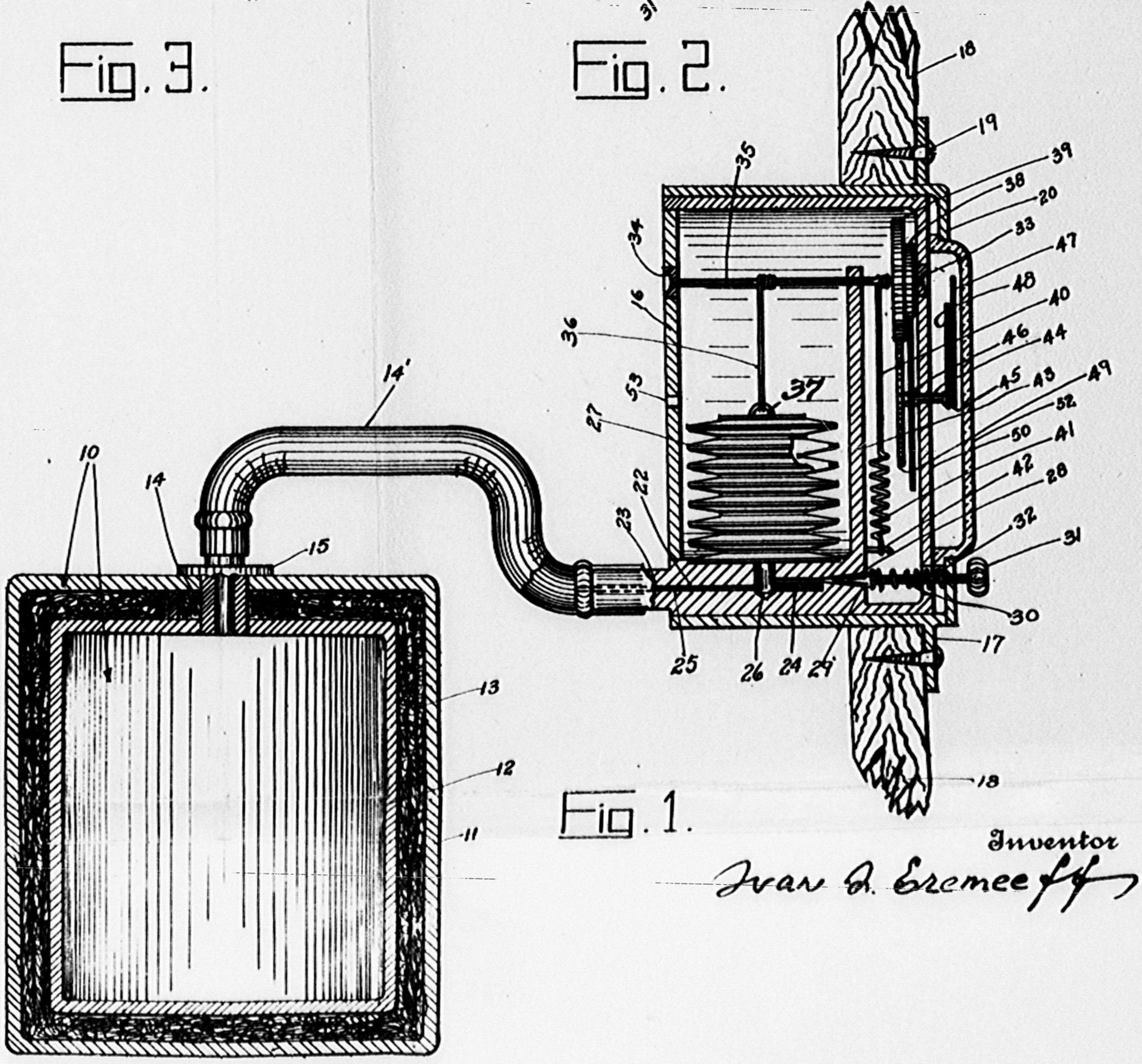


Fig. 1.

Inventor

Ivan I. Eremeeff

July 10, 1928. **1,676,983**

I. I. EREMEEFF

BAROMETRIC DEVICE

Filed July 23, 1921 2 Sheets-Sheet 2

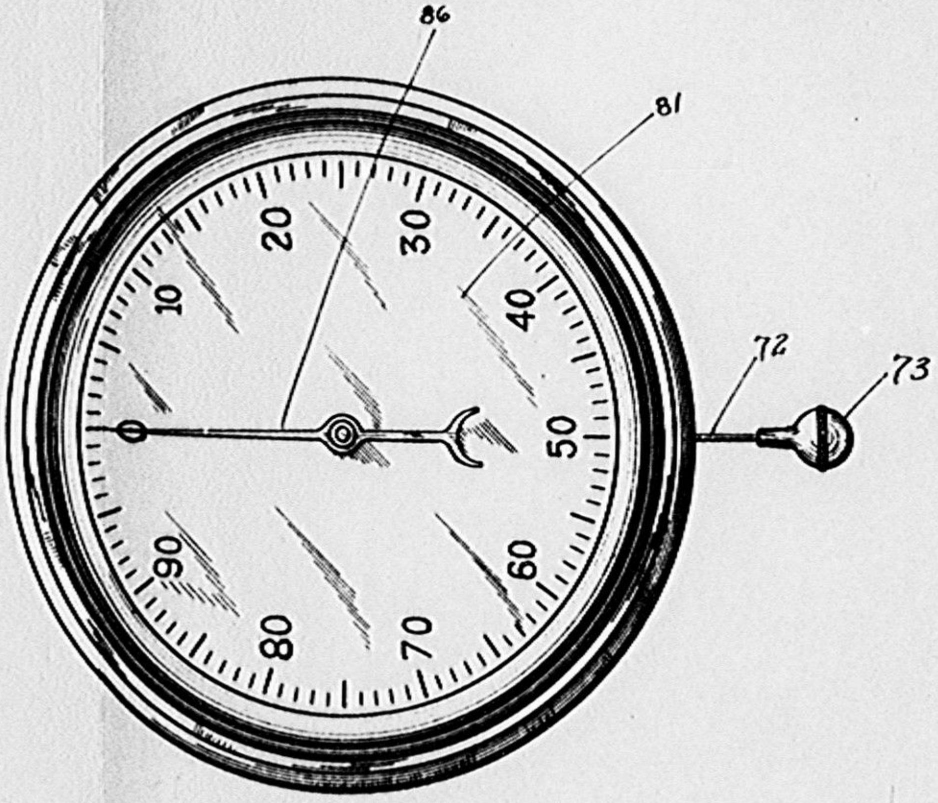


Fig. 5.

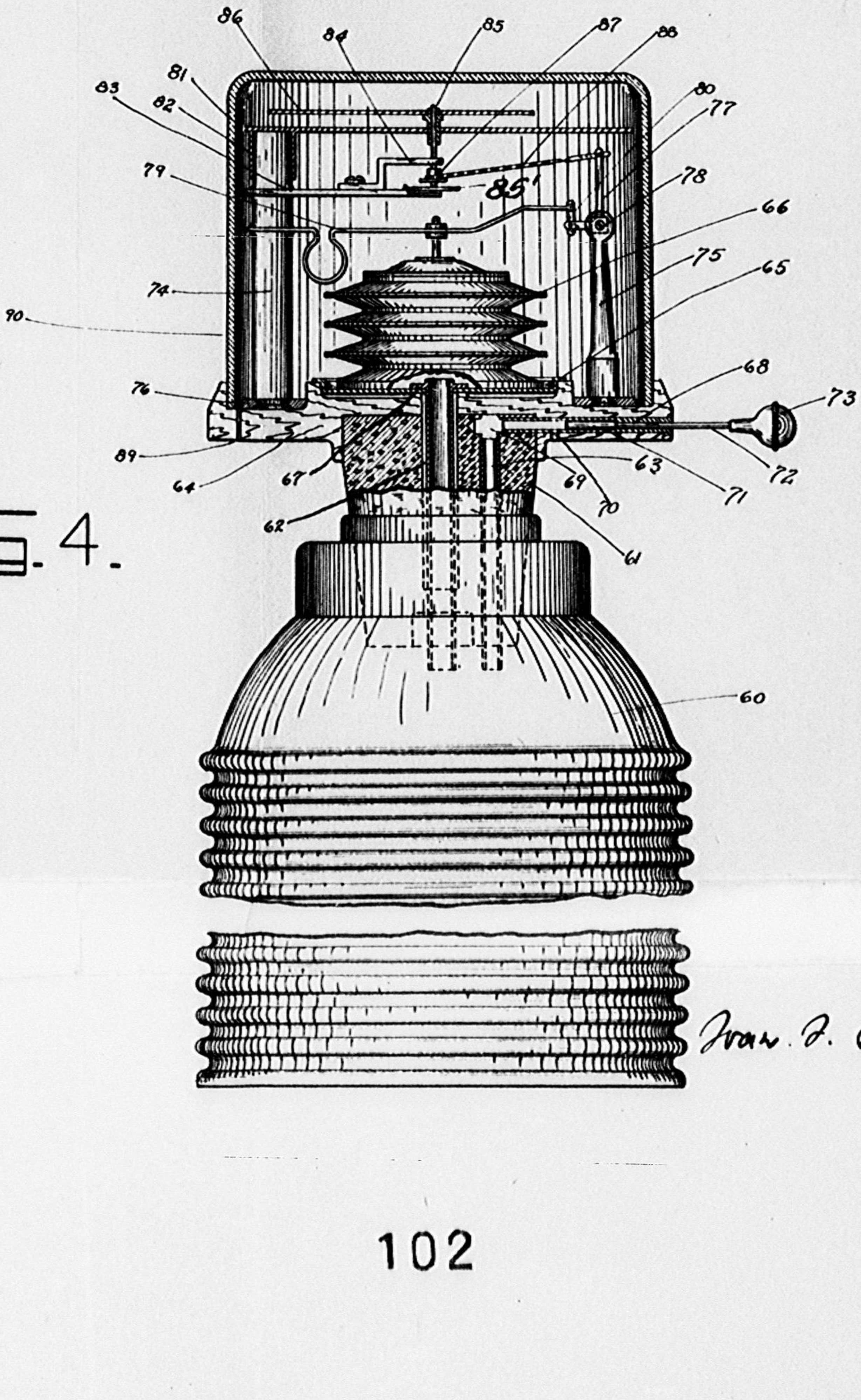


Fig. 4.

Inventor

Ivan I. Eremeeff by

Patented July 10, 1928. **1,676,983**

UNITED STATES PATENT OFFICE.

IVAN I. EREMEEFF, OF DAYTON, OHIO.

BAROMETRIC DEVICE.

Application filed July 23, 1921. Serial No. 487,143.

This invention relates generally to a barometric device and more particularly to an instrument of this type which is intended to indicate small differences of altitude on a magnified scale.

The particular embodiment of the invention described herein is provided with a sensitive mechanism responsive to slight changes in atmospheric pressure and with multiplying devices for indicating the extent of movement of the mechanism.

This invention also aims to provide means for temporarily connecting the mechanism responsive to changes in pressure to the atmosphere so that any desired elevation may be selected as a datum.

Other objects of the invention, consisting of novel features of construction and arrangements of parts, will become apparent on reference to the subjoined specification which describes the invention in connection with the accompanying drawings.

In the drawings:

Figure 1 is a central vertical section through the barometric device;

Figure 2 is a front elevation of the indicating means;

Figure 3 is a front elevation of the instrument case with the front plate removed;

Figure 4 is a side elevation with certain parts shown in vertical section, of a modified form of my invention; and

Figure 5 is a plan view of this modified form showing the indicating dial.

Like numerals of reference indicate corresponding parts throughout the several views of the drawings.

The numeral 10 designates generically a thermally insulated casing having the outer shell 11 and the inner shell 12 spaced therefrom and adapted to contain fluid under constant pressure for a given datum. The space between these shells is preferably filled with a substance 13 which is a poor conductor of heat, such as felt. This casing is provided at the top with an opening which pierces both of the shells, and a tube 14 is inserted in this opening and is provided with a flange 15 which is adapted to abut against the outer shell 11 in air tight relation thereto.

An instrument case 16 is mounted in a suitable annular bracket 17 which is secured to the dash or instrument board 18 of an aircraft or motor vehicle by means of screws 19. This bracket is formed with a depending annular flange 20 and the instrument case 16 is inserted through the rear end of the bracket and maintained in place by means of the screws 21 which pass through suitable apertures formed in the flange 20 and engage screw threaded apertures formed in the front face of the instrument case. The base 22 of the instrument case is made somewhat thicker than the other walls thereof and is provided with an outstanding nipple 23, an air chamber 24 and an air duct 25 which passes through the nipple. The passage 25 and the chamber 24 communicate at their inner ends with a central opening or conduit 26 which is adapted to communicate with the interior of a suitable pressure responsive device herein illustrated in the form of a bellows 27. The bellows is located within the instrument case 16 and is attached at its lower end to the base 22 concentrically about the conduit 26. The air chamber 24 communicates near its outer end with a conical passage 28 controlled by a slidable, conical valve 29. The valve 29 is formed with an outwardly extending stem 30 which passes through an aperture in the flange 20. The outer end of this valve stem is equipped with a knob or handle 31 whereby the valve may be conveniently operated against the tension of a coil spring 32 which is compressed between the flange 20 and the conical plug of the valve 29 and thus normally tends to retain the valve upon its seat.

Opposite walls of the instrument case 16 are provided with plugs 33, 34, one or both of which may be detachably mounted therein. These plugs are formed with central apertures which are adapted to receive the reduced outer ends of a shaft 35 so that the latter is rotatably mounted in bearings thus formed in the plugs 33, 34. A flexible connection such as a chain 36 is secured at one end to the shaft 35 and at the other end to a loop 37 secured to the cover plate of the bellows.

Near one end of the shaft 35 a gear set, composed of a small gear 38 and a large gear 39, is secured. A flexible connection such as a chain 40 is wound upon the shaft 35 in a direction opposite from chain 36, and the lower end of this chain 40 is connected to one end of a spring 41, the other end of which is fastened to a hook 42 projecting outwardly from a partition wall 43. This partition wall divides the instrument case into two communicating compartments, one containing the pressure responsive device and the other containing the transmitting gearing, some of which is above described. An aperture 44 is formed in the front wall of the instrument case and telescoping shafts consisting of the inner shaft 45 and the outer shaft 46 are rotatably mounted in this aperture. The shaft 45 carries the long indicating hand 47, and the shaft 46 carries the short indicating hand 48. In order that the hands 47 and 48 may have the correct relative motion, the shafts 45 and 46 carry, respectively, the gears 49 and 50, which mesh with the larger gear 39 and the smaller gear 38. The front plate is provided with a suitable dial 51 and a cover glass 52 is placed over the indicating hands and the dial and is retained in place by the depending flange 20 of the supporting bracket 17. The gearing is preferably arranged so that the large hand will make four revolutions to one revolution of the small hand.

The instrument case 16 is provided with a suitable vent 53 so that the pressure within the case will at all times be equal to the prevailing atmospheric pressure. In order to restore the indicating means to zero position and to damp oscillations of the same, springs 54 are arranged at opposite sides of the bellows and are connected at one end to the loop 37 and at the other end to suitable plugs 55 inserted in the walls of the casing.

A rubber tube or the like 14′ connects the tube 14 of the casing 10 to the nipple 23 of the instrument case and thus communicates the pressure prevailing within the casing 10 to the bellows 27.

When it is desired to use a certain elevation as a datum, the valve 29 is opened so that the pressure within the bellows and casing 10 becomes equalized with the atmospheric pressure. This is the zero indication of the mechanism. The valve 29 is then permitted to close and as the device ascends, the bellows 27 will expand owing to the decreased pressure in the instrument case. The shaft 35 is then caused to turn by the spring 41 and the gearing is operated for moving the hands 47 and 48 in the proper ratio. After the bellows have been expanded to the limit of their design, or after the long hand has made four revolutions, the valve 29 may again be opened and further elevations obtained with reference to this new datum. In the case of descent, the bellows 27 will contract and exert a tension stress upon chain 36 whereby the shaft 35 is turned in opposition to spring 41.

In Figures 4 and 5, a slightly modified form of the invention is shown in which an ordinary thermos bottle 60 is provided with a stopper 61 formed with two parallel passages 62 and 63 in which suitable tubes have been inserted. The stopper 61 is mounted in a recess formed in the bottom of a supporting plate or strip 64 and the top surface of this strip is formed with an annular depression in which is mounted the base plate 65 of a bellows 66. The tube inserted in the passage 62 pierces the base plate 65 and thus communicates with the interior of the bellows. This tube is preferably formed with annular flange 67 which abuts against the base plate 65 in air tight relation.

The stopper 61 is also formed with a transverse opening which is adapted to align with a corresponding opening formed in the supporting plate 64 and these openings are adapted to receive a tube 68 which is connected to the tube contained in the passage 63 by a suitable air tight connection 69. An aperture 70 pierces the plate 64 and the tube 68 in spaced relation to the connection 69, and a valve 71 is slidably mounted in the tube 68 to control the communication between the vent 70 and the interior of the thermos bottle 60. In order to limit the motion of the valve 71 a suitable shoulder is formed in the tube 68 by reducing the diameter of its bore and a valve stem 72 extends through this reduced bore and is connected at its outer end with a knob 73 for convenience of operation. Posts 74 and 75 are secured to a ring 76 which is mounted on the plate 64. These posts extend upwardly on opposite sides of the bellows 66 and a bell crank lever 77 is pivoted to the upper end of the post 75 by a stub shaft 78. A spring 79 is connected at one end to the post 74, at the other end to a link 80, and intermediately it is connected to the cover plate of the bellows. The link 80 is pivoted at one end to one arm of the bell crank lever 77. A dial plate 81 has a sleeve extension 82, by means of which it is mounted upon the upper end of the post 74. A plate 83 is secured to the post 74 in spaced relation to the dial plate and a bent plate 84 is secured to the plate 83 and has an arm projecting in spaced relation thereto. A shaft 85 extends through an opening in the dial plate and an aligning aperture in the arm of plate 84 and abuts at its lower end against the plate 83. The shaft 85 is rotatably mounted in the bearings thus provided and is equipped at its upper end with an indicating hand 86. A coil spring 85′ is connected at one end to the shaft and at the other end to the plate 83. Shaft 85 has attached thereto a small sprocket wheel or pulley 87 and a chain 88 is secured at one end to the pulley and at the other end to the long arm of the bell crank lever 77. A vent 89 is provided in the supporting strip 64 in order to maintain atmospheric pressure within the casing 90 which contains the bellows 66. The casing 90 is preferably made of transparent material so that the readings indicated by the hand 86 may be readily visible.

This form of my invention operates similarly to the form illustrated in Figures 1, 2 and 3. The valve 71 is first opened in order to obtain the prevailing atmospheric pressure within the thermos bottle and bellows. This valve is then closed so as to shut off communication between the atmosphere and the interior of the thermos bottle and bellows. As the aircraft or motor vehicle ascends, the bellows will expand and act upon the spring 79 so as to actuate bell crank 77 which through the medium of chain 88 actuates shaft 85 and the indicating hand 86.

The apparatus of this invention is intended primarily to indicate relatively small differences in elevation such as 4,000 feet but it will be understood that it may also be applied to greater differences in altitude, depending, of course, upon the design of the pressure responsive means and the ratio existing between the movement of the pressure responsive means and the indicating device. The apparatus may also be used as a simple barometer to indicate weather conditions. When mounted on a motor vehicle the device may be used in connection with a chart or other recording mechanism to indicate the topography of the land traversed by the vehicle.

It is evident that those skilled in the art to which this invention appertains may vary the details of construction, as well as the arrangement of parts, without departing from the spirit of the invention, and therefore I do not wish to be limited to the above disclosure except as may be required by the appended claims.

I claim:

1. An instrument of the class described, comprising in combination a casing, an instrument case having a vent communicating with the atmosphere, pressure responsive bellows within said instrument case, said bellows being attached to said instrument case on one end, the other end whereof is movable in response to variations in the support afforded thereto by the internal pressure of said bellows against atmospheric pressure, means forming a communicative passage between the interior of said casing and the interior of said bellows, mechanism in the instrument case for indicating the extent of movement of said bellows and a normally closed valve adapted to be opened to afford communication between the atmosphere and said means and the interior of said bellows.

2. An instrument of the class described comprising the combination with an instrument case having a vent communicating with the atmosphere, pressure responsive bellows within said instrument case, said bellows being attached to said instrument case on one end, the other end whereof is movable in response to variations in the support afforded thereto by the internal pressure of said bellows against atmospheric pressure, a shaft rotatably mounted in said case, a connection between said bellows and shaft for rotating said shaft in one direction, spring devices tending to return the shaft to normal position, an indicating device, and transmitting mechanism between said shaft and said indicating device, of a casing, means forming a communicative passage between the interior of said casing adapted to contain fluid under pressure and the other end of said bellows and valve means between said passage and the atmosphere.

3. An instrument of the class described comprising the combination with an instrument case having a vent communicating with the atmosphere, pressure responsive bellows within said case, a rotatable shaft within said instrument case, an indicating device therefor, a connection between said bellows and shaft for rotating said shaft in one direction, spring actuated means tending to rotate said shaft in the other direction for transmitting relative motion of said pressure responsive bellows to said indicating device, of a casing, a member having a passage therethru and connecting the interior of said casing with interior of said pressure responsive bellows, and valve means for opening and closing communication between the atmosphere and the interior of said pressure responsive bellows and said casing respectively.

4. In an instrument of the class described comprising in combination, an instrument case, a pressure responsive bellows therein, a thermally insulated casing, a member provided with a passage and connecting the interior of said casing and the interior of said bellows, devices for connecting the interior of said pressure responsive bellows and said casing to the atmosphere at desired intervals, a rotatable shaft, a connection between said shaft and said bellows for rotating said shaft in one direction or the other depending upon the expansion or contraction of said bellows, spring devices extending laterally from said bellows for returning the latter to normal position, an indicating device and transmitting mechanism in the instrument case and between said shaft and indicating device.

In testimony whereof I have affixed my signature.

IVAN I. EREMEEFF.

(No Model.)

T. MUNNELL.

CASH REGISTER.

No. 309,240. Patented Dec. 16, 1884.

Fig. 1.

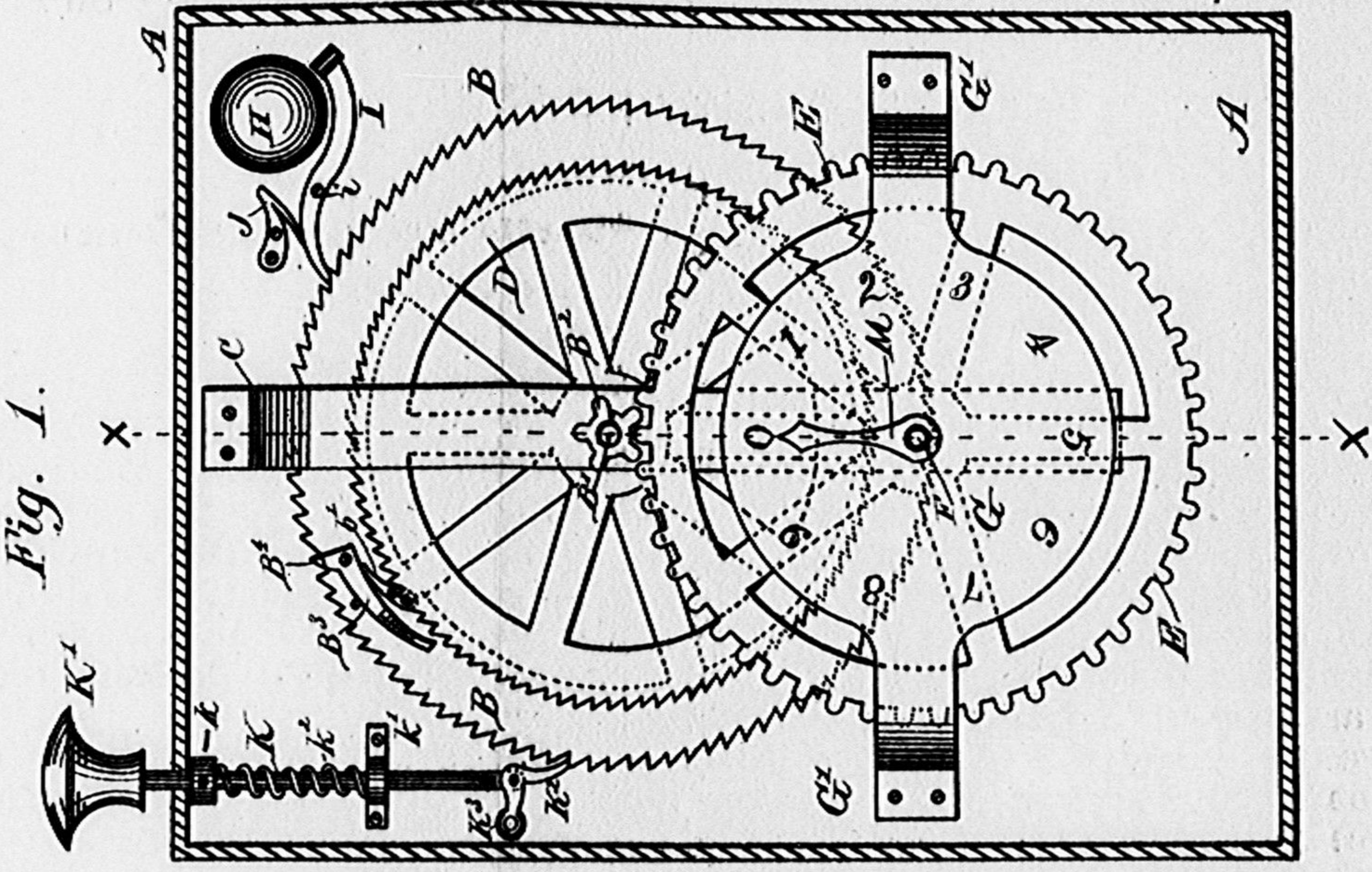


Fig. 6.

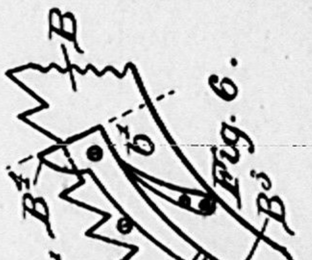


Fig. 8.

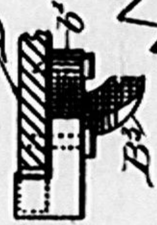


Fig. 3.

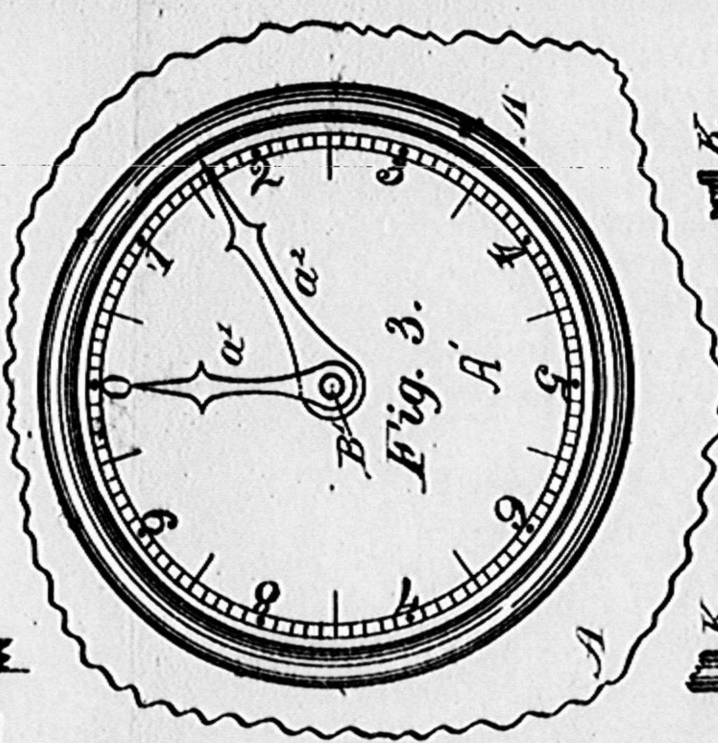


Fig. 4.

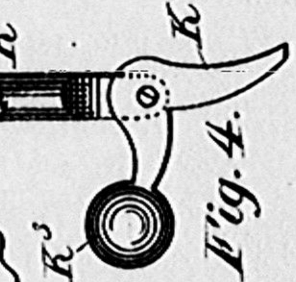


Fig. 7.

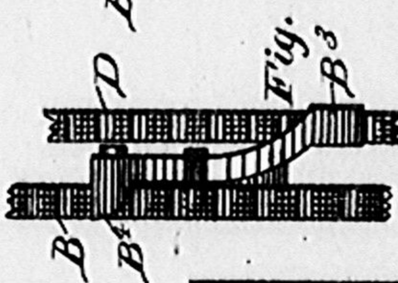


Fig. 5.

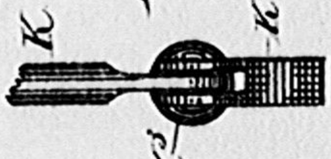
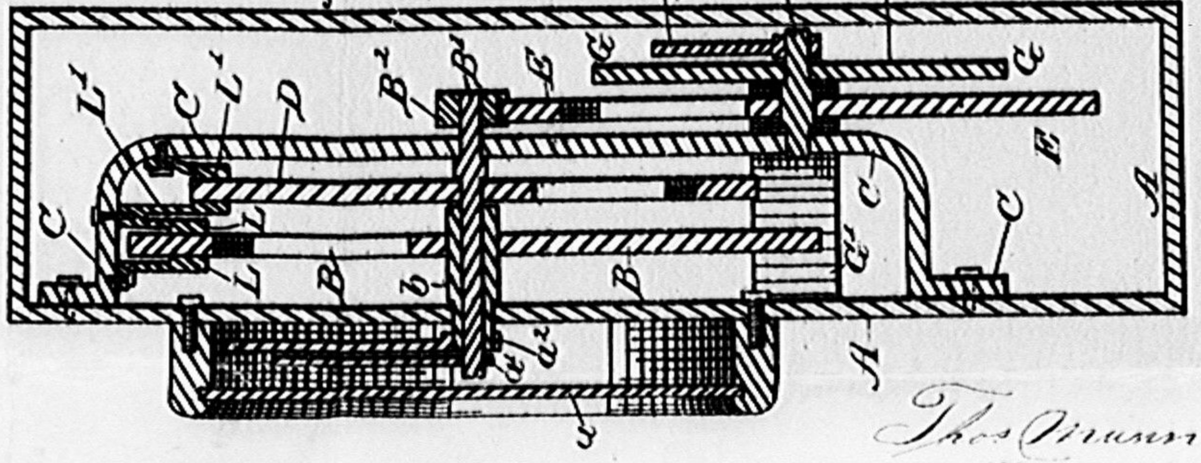


Fig. 2.



Witnesses
John C Miller
Percy G. Bowen

Thos Munnell
Inventor

By Lafayette Bingham
Attorney.

UNITED STATES PATENT OFFICE.

THOMAS MUNNELL, OF MOUNT STERLING, KENTUCKY.

CASH-REGISTER.

SPECIFICATION forming part of Letters Patent No. 309,240, dated December 16, 1884.

Application filed June 4, 1884. (No model.)

To all whom it may concern:

Be it known that I, THOMAS MUNNELL, of Mount Sterling, in the county of Montgomery and State of Kentucky, have invented certain new and useful Improvements in Cash-Registers; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The object of this improvement is to produce an apparatus for registering cash payments made at toll-gates, soda-fountains, and such like places of business, to a very high number in a way that cannot be tampered with by the operator. These results are attained by the mechanism illustrated in the drawings, herewith filed as part hereof, in which the same letters of reference denote the same parts in the different views.

Figure 1 is a rear elevation, partly in section, of a registering apparatus embodying the features of my improvement. Fig. 2 is a vertical transverse section, taken on the line x x of Fig. 1. Fig. 3 represents a section taken from the front of the apparatus, for the purpose of giving a more complete view of the dial. Fig. 4 is a section of one of the parts. Fig. 5 is a view of the same as seen from a different direction. Fig. 6 is a sectional view of one of the parts. Fig. 7 is a sectional view of connecting parts. Fig. 8 is a sectional view more fully illustrating the construction and relation of the parts.

A A A is an inclosing-case, to be made preferably of metal, with the parts shown integral with each other.

B is a ratchet-wheel having a sleeve or hub, b, integral therewith, by means of which it is loosely secured upon and supported by a shaft, B', having bearings in the front of the inclosing-case A, and the frame-piece C, secured thereto by any suitable means.

D is a ratchet-wheel of less diameter than the wheel B, and rigidly secured to the shaft B', which is provided at its rear end with a pinion, B^2, having five cogs, for a purpose hereinafter set forth. The shaft B' and the sleeve or hub b of the ratchet-wheel B pass through the front of the casing A, which is provided with a registering-dial, A', inclosed by the circular part of the case, and having a vision-glass, a. The shaft B' is provided at its front end with an indicator, a', and the front end of the sleeve or hub b is provided with an indicator, a^2, of greater length than the indicator a'.

E is a gear-wheel having fifty cogs meshing with the pinion B^2, and mounted on a shaft, F, having bearings in the frame-piece C, and registering dial-plate G, having integral therewith curved extensions G' G', by means of which it is secured to the inclosing-case, as fully shown in Fig. 1.

H is a bell suitably secured to the inclosing-case, to which is also secured, by means of a pivot, i, a hammer, I, in a position to engage with the bell H, the ratchet-wheel B, and a tension-spring, J.

B^3 is a pawl affixed to the side of the ratchet-wheel B. The pawl B^3 has an extension, B^4, which occupies the position of a serration of the ratchet-wheel, which is deprived of a serration in order to make room for said pawl-extension B^4.

K is a rod provided with a knob, K', a collar, k, and a spiral-spring, k^2, which supports the roll K by pressure against the collar k and eye k'.

Pivoted to the lower end of the rod K is a pawl, K^2, having a weighted extension, K^3, and arranged to engage with the ratchet-wheel B. The pawl B^3 is arranged to engage with the ratchet-wheel D once only to each revolution of the ratchet-wheel B, as will be hereinafter more fully explained, during the revolution of which wheel the pawl is held clear of the serrations of the wheel D by means of the spring b', as shown in Figs. 1, 6, and 8.

L L and L' L' are rubbers or brakes arranged to bear upon the ratchet-wheels B and D and prevent them from moving more than one serration at a time.

The mechanism is operated by means of the pawl K^2 K^3, through pressure on the rod K, which, because of the knob K', can move only far enough to turn the wheel B the distance of one serration, after which the spiral spring k^2 will raise the rod to the position shown.

With each payment received the employé is required to press down the rod K and move the ratchet-wheel B one serration, which will allow the inner end of the hammer I to drop over the point of the serration, when the spring J will force the outer end against the bell H and cause it to ring. Failure of the employé to register each payment by said ringing is to be considered as evidence of fraud. With each revolution of the wheel B the pawl K^2 will come in contact with the extension B^4 of the pawl B^3 and cause the said pawl to engage with and move the ratchet-wheel D the distance of one serration, the shaft of which is provided with a pinion, B^2, which engages with and moves the cog-wheel E, to the outer end of which is affixed an indicator, M, and a dial or index register, G. Because of the ratchet-wheel B having one hundred serrations, each revolution made by it will register one hundred receipts. As there are one hundred serrations in the ratchet-wheel D, and as it moves but one serration to each revolution of the wheel B, it will require one hundred revolutions of the latter to produce one revolution of the wheel D, which for that reason will register one thousand payments. As the five-cog pinion B^2 which engages with the gear-wheel E, having fifty cogs, is secured to the same shaft as the ratchet-wheel D, it will take ten revolutions of the latter to produce one revolution of the wheel E, and each single revolution of the wheel D and pinion B^2 will move the indicator M one space or number on the index-register G, or a proportional distance of the space between the numbers thereon, according to the circumstances.

The apparatus should be started with both the indicator-hands *a′ a²* at zero, and when the long hand makes one revolution the short hand will move up one space, and so on throughout.

The rear of the apparatus is to be closed, and the dial G is not to be accessible, except to the employer, who, by examining the rear dial, can ascertain at any time the exact number of receipts registered, and may call for an account corresponding thereto.

Any suitable door and lock may be used for securing the inclosure of the dial G.

Having explained the construction and operation of my improvement, what I claim as new, and desire to secure by Letters Patent, is—

The ratchet-wheels B D, in combination with the pawl mechanism K K' K^2 K^3, and the pawl mechanism B^3 B^4, secured to the wheel B, sleeve *b*, dial A′, indicators *a′ a²*, shaft B′, pinion B^2, shaft F, gear-wheel E, mounted on shaft F, the dial G, and indicator M, all constructed and arranged to operate substantially as specified, for the purpose set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

THOMAS MUNNELL.

Witnesses:
TOM. CORNELISON,
LESSIE CORNELISON.

N° 475.931 M. Rasch Pl. unique

Fig. 1.

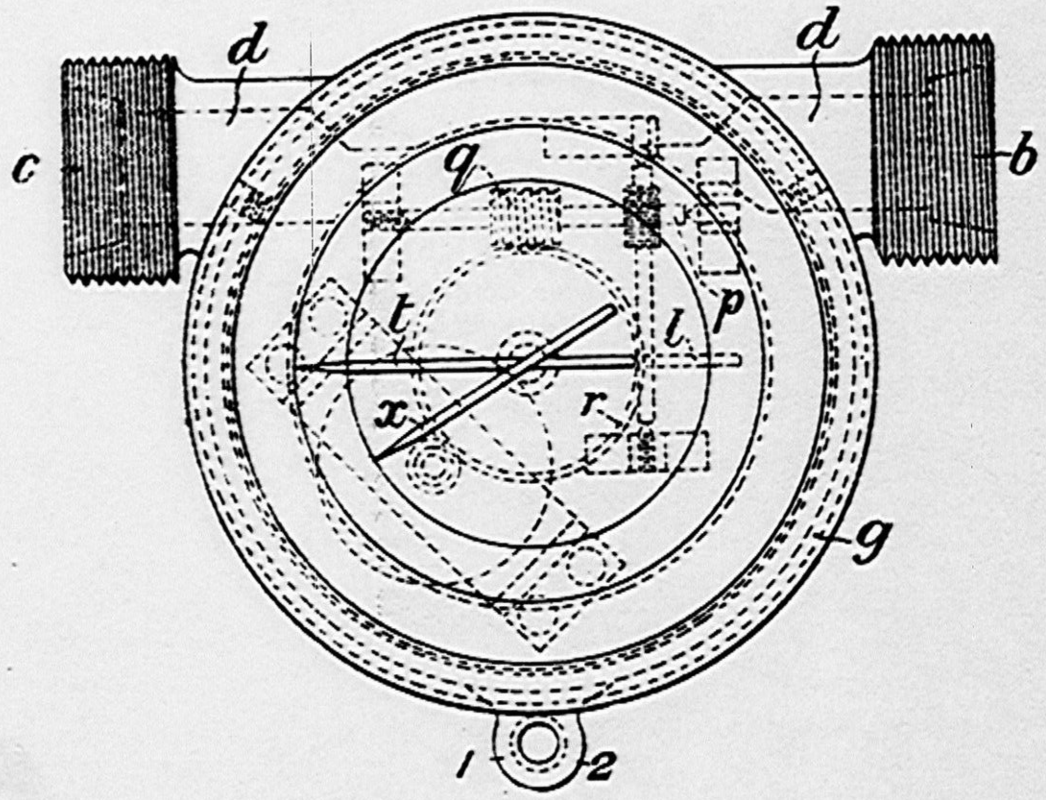


Fig. 2.

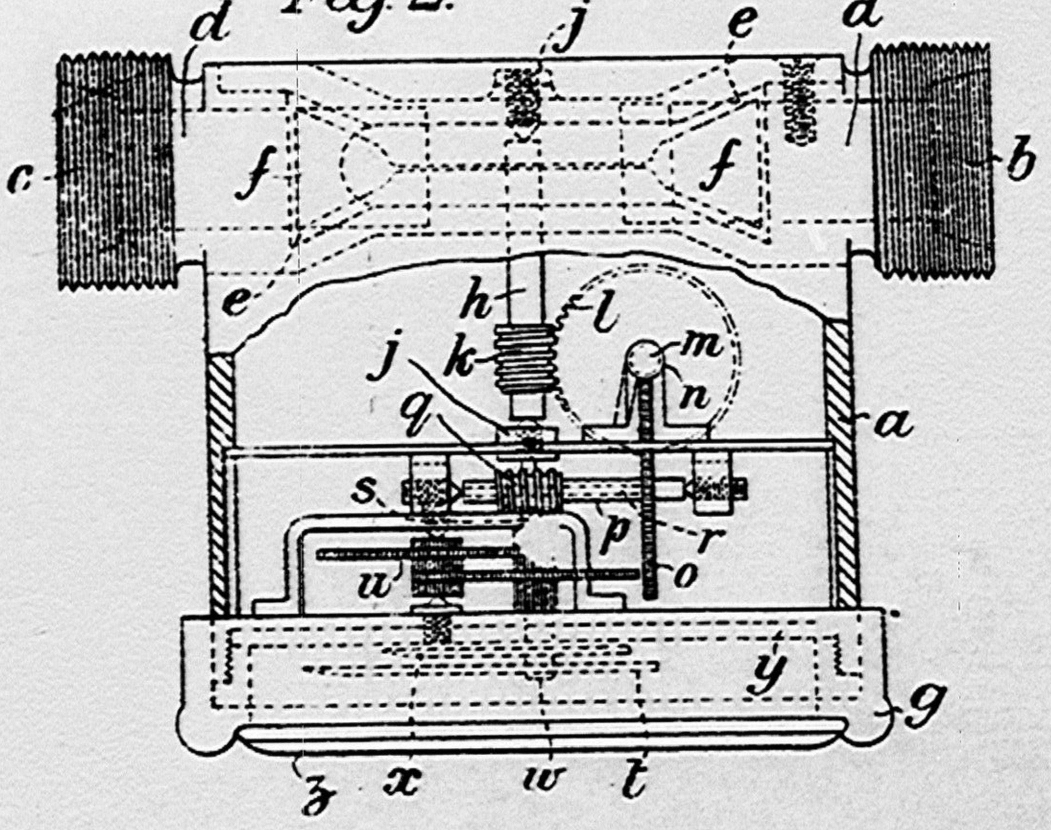


Fig. 3.

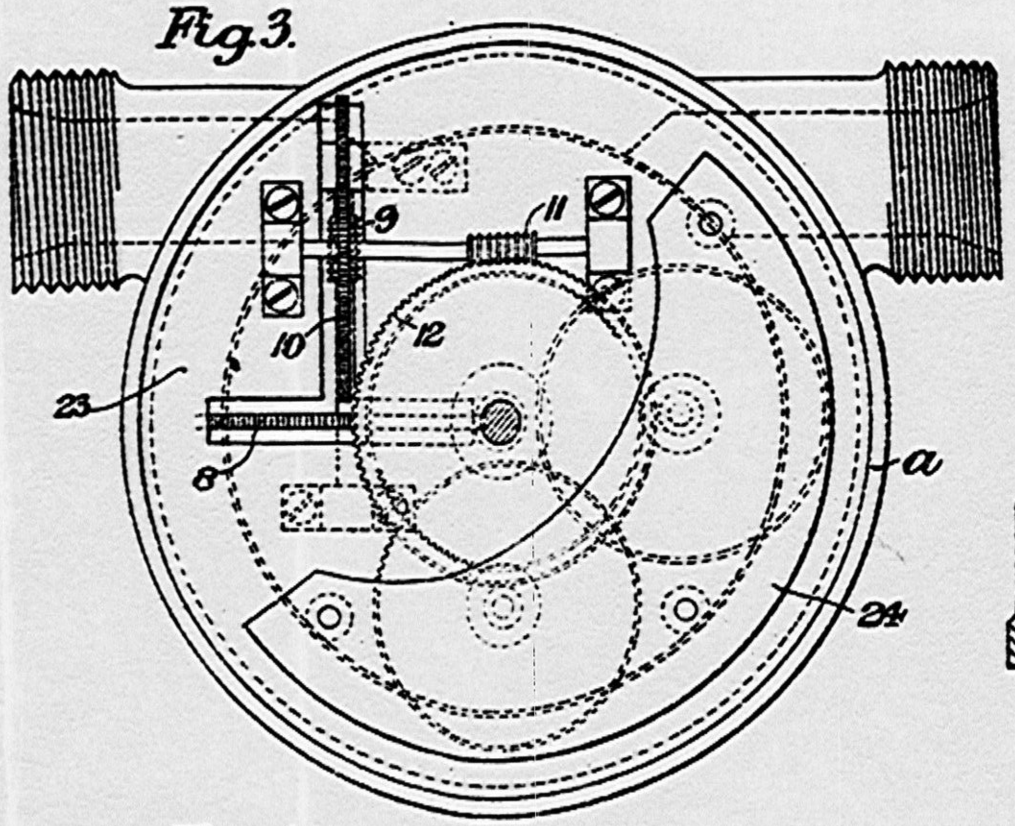


Fig. 4

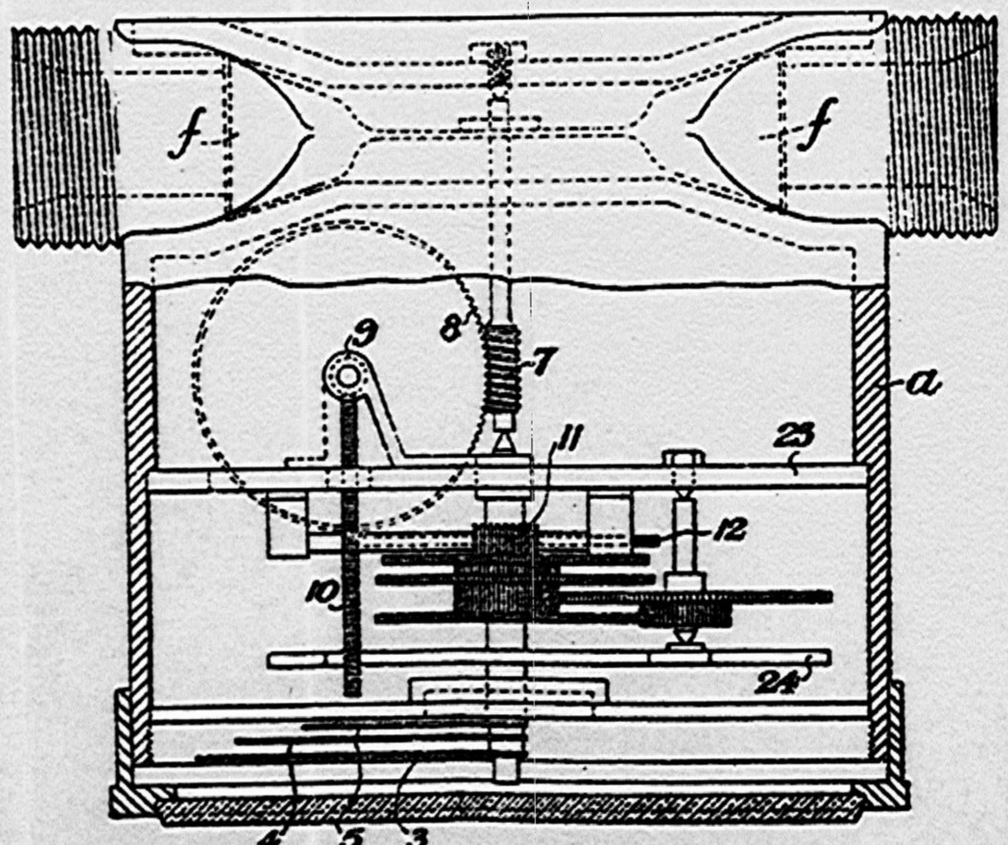


Fig. 5.

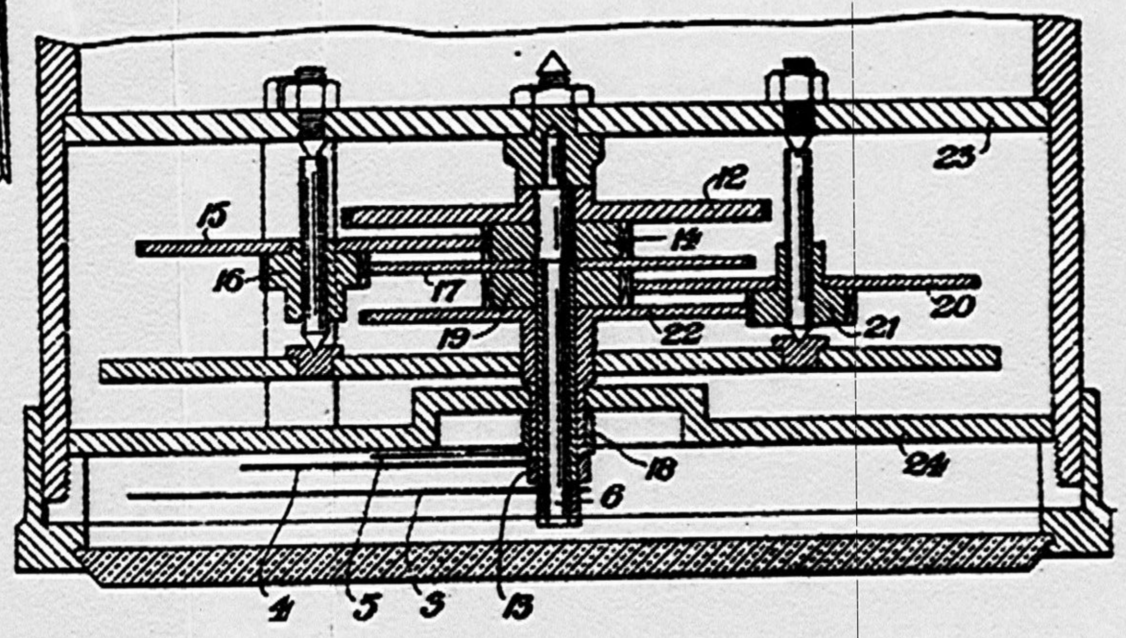
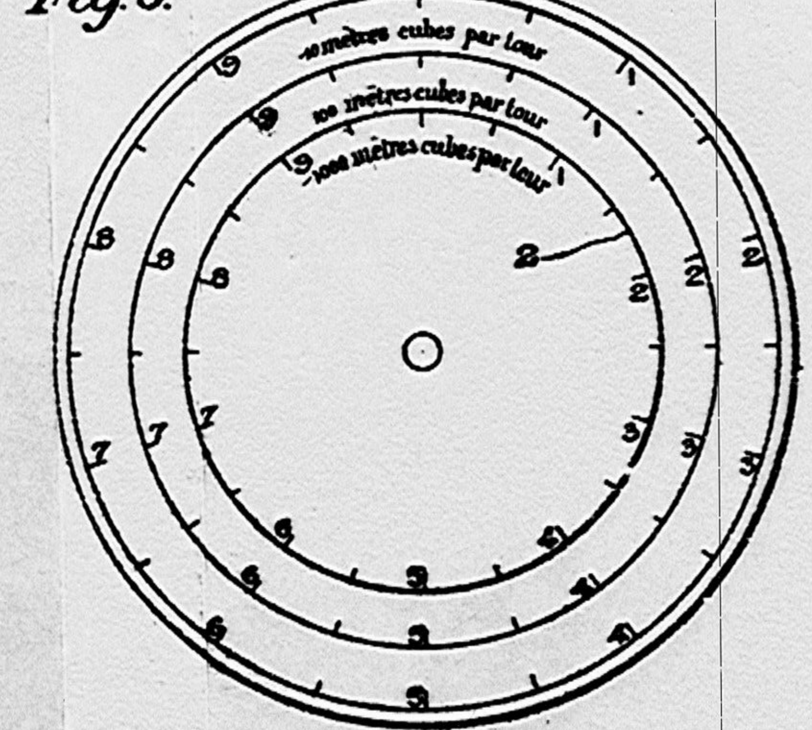


Fig. 6.



Translation of French patent no. 475931, class XII-
110 3, to Louis Rasch residing in England, applied for
Aug. 5, 1914, granted April 6, 1915, published June
24, 1915.

Improvements in gas meters.

This invention relates to gas meters of the type in which a vane wheel driven by the gas causes pointers to turn for the purpose of indicating on a dial the value or the quantity of the gas consumed.

According to the invention the vane wheel driven by the gas is placed in the gas pipe in such a way that the power of the gas passing before the vane wheel is utilized practically to its full extent to give a rotary motion to the wheel; for this purpose the line along which the gas passes is tangent to the periphery of the vane and the said pipe is placed above the axis of the wheel, the transverse section of the gas pipe coinciding nearly with the surface of the vanes of the wheel.

In the drawing attached hereto: Fig. 1 is an elevation of a meter intended to indicate the value (price) of the gas
consumed, Fig. 2 is a plan view of fig. 1 with the out-
111 side box removed so as to show the mechanism, fig. 3
is an elevation of a meter designed to indicate the
quantity of gas consumed and having three pointers, although a greater number of pointers might be used, fig. 4 is a plan view, the outside box being removed, fig. 5 is a diagram of the train of wheels, fig. 6 shows a dial.

In figs. 1 and 2 the box "a" of the meter is provided with an admission opening b and an outlet opening c for the gas, these openings communicating through conduits d d with a chamber e shaped so as to follow exactly the contour of a vane wheel f, the vanes of this wheel being in turn shaped in such a way as to fit exactly in the interior of the box without touching it. The pipes d d are positioned in such a way that the gas in passing through the meter will impinge on the peripheral vanes of the wheel. A lid g permits access to the wheel and to the chamber for the purpose mainly of convenience of manufacture and for making repairs.

A shaft h carried by suitable pivots j carries the wheel f and likewise a worm k which meshes with a wheel o mounted on a shaft p carrying a worm q. The worm q drives a heli-

cal wheel r which is attached on a shaft s to which
112 is attached by friction a pointer t indicating the value
in money. A speed reducing gear train u and a shaft w drive a pointer x indicating a value in money of a higher denomination; the pointers x and t move over a dial suitably graduated and which is covered by a piece of glass z serving to keep the dial and the pointers protected from dust.

The glass z is held in position by bayonet joints not shown, lugs 1 and 2 being disposed one over the glass z, the other on the box so as to close the meter and prevent in this way the moving of the pointers by unauthorized persons.

In operation the gas enters through the admission pipe b, impinges on the vanes of the wheel f and leaves through the tube c. As the gas is obliged to pass through the chamber e in its passage to the outlet opening c it is also obliged to turn the wheel and consequently to indicate the quantity or the value (price) of the gas which has passed into the meter.

The wheel f in turning drives the gear train and the pointers indicate the cost in money so that the value of the gas consumed may be read off directly.

113 To reset the pointers to zero we remove the glass z and, as the pointers are mounted with friction on their shafts, we can make them turn so as to bring them back to zero without disarranging the mechanism.

This invention is specially useful in its application to gas heaters where one counts on a certain sum for the use of the heater.

In the form shown in figs. 3, 4, 5 and 6 the dial 2 is graduated for 1000 cubic meters; 3, 4 and 5 are the pointers. The pointer 3 is mounted on a shaft 6 and is driven by the vane wheel f by the intermediary of the worm 7, wheel 8, worm 9, wheel 10, worm 11 and wheel 12.

The pointer 4 is mounted on the sleeve 13 and is driven by the vane wheel and wheel train by the intermediary of wheel 12, pinion 14, wheel 15, pinion 16 and wheel 17 mounted on the sleeve 13.

The pointer 5 is mounted on the sleeve 18 and is driven by the vane wheel and the wheel train by the intermediary of the wheel 17, pinion 19, wheel 20, pinion 21, and wheel 22 which is mounted on the sleeve 18. 23 and 24 are plates attached to the box "a" and between which are mounted the toothed wheels.

N° 567.494 Société Charles Zang & Cie Pl. unique

Fig.1

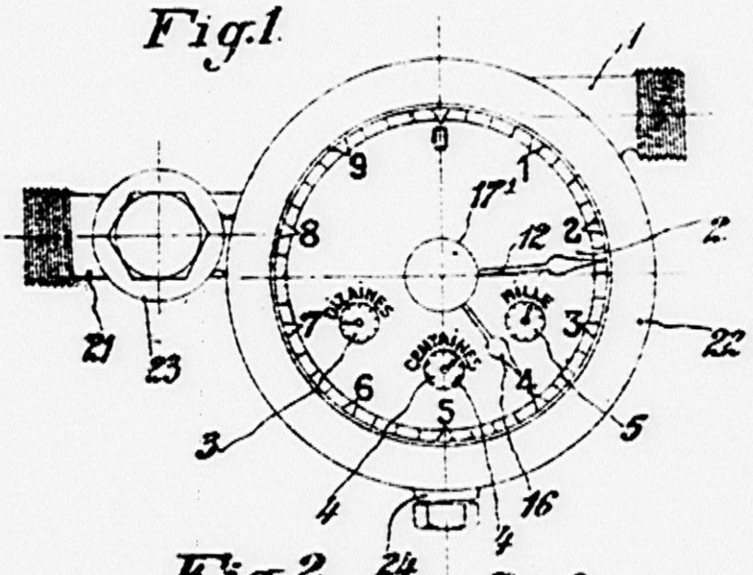
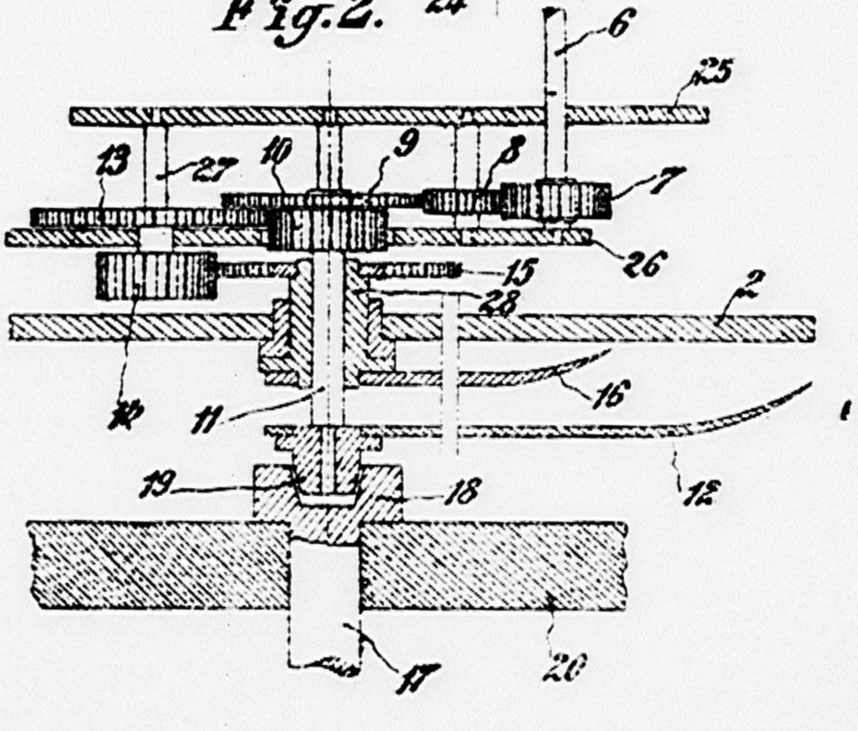


Fig.2.



273/122

EXAMINER'S
DIV. 23

RÉPUBLIQUE FRANÇAISE.

OFFICE NATIONAL DE LA PROPRIÉTÉ INDUSTRIELLE.

BREVET D'INVENTION.

XII. — Instruments de précision, électricité.

3. — Poids et mesures, instruments de mathématiques, compteurs et procédés d'essai.

N° 557.424

Compteur de liquide.

Société Charles ZANG & C^{ie} résidant en France (Seine).

Demandé le 14 octobre 1922, à 11^h 6^m, à Paris.
Délivré le 2 mai 1923. — Publié le 8 août 1923.

Dans les compteurs de liquide généralement en usage le débit est enregistré sur les divers cadrans totalisateurs à une aiguille et s'obtient par la soustraction du nombre primitif du total obtenu en dernier lieu, ce qui provoque quelquefois des erreurs, des contestations, et par suite des ennuis.

La présente invention a pour but d'éviter ou de supprimer les inconvénients mentionnés ci-dessus et elle a pour objet un compteur de liquide et consiste principalement à établir un appareil de ce genre comportant, à part de cadrans totalisateurs à une aiguille, son cadran d'unités destiné aussi pour les débits partiels et possédant deux aiguilles centrales marquant dizaines et unités et se mettant à zéro à la main après chaque débit partiel, sans influer sur le totalisateur.

L'invention est décrite ci-après en détail, avec référence au dessin annexé, représentant, à titre d'exemple et schématiquement, une forme d'exécution d'un compteur de liquide.

La fig. 1 montre la vue, en élévation de face, d'un compteur de liquide à cadrans totalisateurs et à deux aiguilles pour les débits partiels jusqu'à cent litres.

La fig. 2 est une vue, en coupe horizontale, de la minuterie de deux aiguilles concentriques pour les débits partiels.

Dans le dessin, 22 est un compteur possédant une tubulure d'entrée 21 avec un filtre placé sous un bouchon 23, une ouverture de vidange 24, et une tubulure de sortie 1 de liquide mesuré.

Le compteur possède un cadran 2 pour les unités et les débits partiels à deux aiguilles. 16 pour les dizaines et 12 pour les unités, et des cadrans totalisateurs 3-4-5 à une aiguille pour indiquer les dizaines, les centaines et les milles des litres débités.

La minuterie des cadrans totalisateurs 3-4-5 est commandée par des organes moteurs du compteur, comme d'habitude, tandis que les deux aiguilles 12-16 du cadran 2 sont commandées de l'axe moteur 6 actionnant un mécanisme particulier se trouvant, comme les autres, entre les platines 25-26 et le cadran 2.

L'axe 6 porte une roue 7 qui, par l'intermédiaire d'une roue 8, fait tourner la roue 9, fixée sur l'axe central 11.

L'axe 11 porte un pignon 10 et une tête conique 19 à aiguille 12 indiquant les unités des débits généraux et particuliers.

Le pignon 10 actionne une roue 13 portant, sur son axe 27, un pignon 14 engrenant avec la roue 15 du canon 28 placé sur l'axe 11 et portant l'aiguille 16 indiquant les dizaines des débits particuliers, par conséquent ces deux aiguilles tournent dans le rapport de un à dix.

Un bouton 17^1 de la tige 17 traversant le

Prix du fascicule : 1 franc.

verre *20*, permet d'agir par son chapeau conique *18*, sur la tête *19* et par conséquent de remettre à zéro, à la main, l'aiguille *12* ainsi que l'aiguille *16* qui en est solidaire.

RÉSUMÉ.

L'invention a pour objet un compteur de liquide et porte sur les principaux points suivants :

Un compteur de liquide comportant, à part le cadran totalisateur à une aiguille, son cadran d'unités destiné aussi pour les débits partiels et possédant deux aiguilles centrales marquant dizaines et unités et se mettant à zéro, à la main, après chaque débit partiel, sans influencer les indications du totalisateur.

SOCIÉTÉ CHARLES ZANG & Cie.

Par procuration :

H. Boettcher fils.

Pour la vente des fascicules, s'adresser à l'Imprimerie Nationale, 87, rue Vieille-du-Temple, Paris (3e).

114 The pointer 3 may be regulated so as to indicate 10 cubic meters per revolution, the pointer 4 to indicate 100 cubic meters per revolution and the pointer 5 to indicate 1000 cubic meters per revolution.

The gas passes directly through the meter and its direction is not modified in the box.

With a meter constructed according to the present invention the power due to the passage of the gas is utilized to drive the meter with the minimum of loss and the maximum of efficiency.

Resumé

This invention has for object a gas meter of the type in which a wheel driven by the gas actuates pointers for the purpose of indicating on a dail the quantity or the value of the gas consumed and it relates more specially to the following points.

1. The cross section of the gas pipe nearly coincides with the surface of the vanes of the wheel so that the power of the gas in passing before the wheel is utilized practically for its whole extent.

2. The combination of a vane wheel disposed in the gas pipe in such fashion that the direction of the current of gas shall be tangent to the periphery of the wheel, trains of gear wheels with three (or more) pointers mounted on the same shaft, and driven by the vane wheel and a dial
115 provided with three (or more) scales are provided to indicate the quantity of gas passing through the meter.

Tr/CP.
2/5/36.

(Here follows photostats marked pages 116, 117 and 118.)

119 Translation of French patent no. 557 424, class XII-3, to Societe Charles Zang & Cie. residing in France (Seine) applied for October 14, 1922, granted May 2, 1923, published Aug. 8, 1923.

Liquid meter

In the liquid meters generally in use the flow is registered on the various totalizing dials with a pointer and is obtained by the subtraction of the original number from the total last obtained which sometimes causes errors, disputes and consequently annoyance.

The present invention has for purpose avoiding or doing away with the objections mentioned above and it has for object a liquid meter and consists chiefly in establishing an apparatus of this type having, besides the totalizing dials with pointer, its unit dial designed also for registering fractional flows and having two central pointers marking tens and units and being set to zero by hand after each partial flow without influencing the totalizer.

The invention is described hereinafter in detail with reference to the attached drawing, showing, by way of example
and in outline one form of execution of a liquid
120 meter.

Fig. 1 shows the view, in frontal elevation, of a liquid meter with totalizing dials and two pointers for the fractional flows up to one hundred liters.

Fig. 2 is a view, in horizontal section, of the mechanism for the two concentric pointers for the fractional flows.

In the drawing, 22 is a meter having an inlet pipe 21 with a filter placed under a plug 23, a drain opening 24, and an outlet pipe 1 for the liquid measured.

The meter has a dial 2 for the units and the fractional flows with two pointers, 16 for the tens and 12 for the units, and totalizing dials 3-4-5 with one pointer for indicating the tens, hundreds and thousands of liters delivered.

The clockwork mechanism of the totalizing dials 3-4-5 is driven by the motive parts of the meter, as usual, while the two pointers 12-16 of the dial 2 are driven by the driving shaft 6 actuating a special mechanism which, like the others, is located between the plates 25-26 and the dial 2.

The shaft 6 carries a wheel 7 which, by the intermediary of a wheel 8, causes the wheel 9 to rotate which is fixed on the central shaft 11.

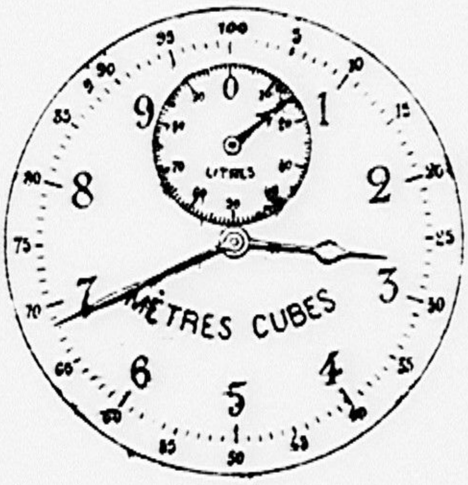
The shaft 11 carries a pinion 10 and a conical head
121 19 with pointer 12 indicating the units of the general and special deliveries (flows).

The pinion 10 drives a wheel 13 carrying, on its shaft 27, a pinion 14 engaging with the wheel 15 of the sleeve 28 placed on the shaft 11 and carrying the pointer 16 indicat-

235/112

Compagnie pour la Fabrication des
Compteurs et Matériel d'Usines à Gaz

Brevet N° 51663
1 feuille



n°3

CONFÉDÉRATION SUISSE

BUREAU FÉDÉRAL DE LA PROPRIÉTÉ INTELLECTUELLE

EXPOSÉ D'INVENTION

N° 51663 6 avril 1910, 6 ½ h. p. **Classe 64**

BREVET PRINCIPAL

COMPAGNIE POUR LA FABRICATION DES COMPTEURS
ET MATÉRIEL D'USINES A GAZ, Paris (France).

Perfectionnement aux mécanismes enregistreurs pour compteurs.

Les mécanismes enregistreurs pour compteurs sont généralement constitués, soit par une série de cadrans fixes comportant les graduations correspondant aux unités qu'ils représentent et devant chacun desquels se déplace une aiguille indicatrice correspondante, mise en mouvement par le compteur, soit par une série de tambours ou de disques rotatifs portant à leur périphérie une graduation dont les chiffres défilent, dans leur mouvement de rotation continu ou alternatif, devant un guichet ou devant un index permettant la lecture.

La première disposition offre l'inconvénient de ne pas permettre une totalisation immédiate au premier coup d'œil et par simple lecture; en effet, il faut lire successivement chacune des indications portées sur les cadrans représentant les unités des divers ordres, puis associer les chiffres lus pour connaître le total enregistré par le mécanisme du compteur. On commet ainsi facilement des erreurs, et cela d'autant mieux que, dans certaines positions des aiguilles, il y a encore incertitude quant à l'évaluation des chiffres indiqués par celles-ci.

La seconde disposition ne facilite la lecture que lorsque les chiffres sont parfaitement alignés. Or, ils ne se trouvent dans cette situation que tout à fait exceptionnellement, puisque le débit a pour effet de faire varier constamment leurs positions respectives.

Chaque fois qu'un d'entre eux est en mouvement, la lecture devient difficile et des erreurs peuvent se produire, puisque pendant tout le temps que ce chiffre met à s'effacer et à céder sa place devant le guichet ou l'index au chiffre qui suit, rien n'indique clairement celui de ces deux chiffres qui doit être inscrit.

La présente invention a pour objet un perfectionnement aux mécanismes enregistreurs pour compteurs, consistant en un cadran disposé à la façon d'un cadran de pièce d'horlogerie, et sur lequel se déplacent des aiguilles ayant même axe de rotation, et destinées à indiquer des unités d'ordres différents, les aiguilles parcourant dans ce but un même cercle principal dont les divisions sont chiffrées, pour constituer deux graduations d'unités d'ordres différents, devant lesquelles évoluent respectivement chacune desdites aiguilles indicatrices.

La figure unique du dessin annexé représente, à titre d'exemple, un cadran établi d'après la présente invention. Lequel peut être appliqué à tout genre de compteurs, à eau, à gaz, etc., les graduations étant appropriées en conséquence.

Le grand cercle est divisé en dix divisions principales, subdivisées elles-mêmes en dix divisions secondaires. l'échelle graduées comportant ainsi cent divisions équidistantes, auxquelles correspondent deux séries de chiffres disposés respectivement à l'extérieur et à l'intérieur du cadran.

Les chiffres extérieurs qui représentent les unités sont marqués de cinq en cinq, et l'échelle complète s'étend ainsi sur cent unités parcourues successivement par une grande aiguille dans un tour complet.

Les chiffres intérieurs sont placés en regard des divisions principales. Celui d'entre eux que la petite aiguille désigne comme devant être inscrit lorsqu'on relève le débit représente le nombre de centaines, attendu que la petite aiguille parcourt une division principale chaque fois que la grande aiguille fait une révolution complète correspondant à 100 unités.

Dans l'exemple représenté, la petite aiguille indique 200 et la grande 68. le total est donc 268 unités.

Il est à remarquer tout d'abord que, de cette façon, les erreurs sont à peu près impossibles, puisque la lecture des unités d'ordre inférieur, y compris les dizaines, se fait directement et sans qu'il soit nécessaire d'établir une comparaison entre les positions respectives des aiguilles de cadrans distincts ou des chiffres de tambours sauteurs des mécanismes enregistreurs actuellement en usage.

En ce qui concerne l'évaluation des unités d'ordre plus élevé (centaines), toute erreur est également évitée, attendu qu'il suffit — comme pour lire l'heure sur une montre — de jeter un coup d'œil sur les aiguilles, quelles que soient leurs positions respectives pour relever le chiffre du débit sans hésitation et sans qu'il soit possible de se tromper d'une centaine, pas plus qu'il n'est possible de se tromper d'une heure sur le cadran d'une montre.

Les unités et graduations adoptées pour le cadran représenté n'ont évidemment été choisies qu'à titre d'exemple, toute autre échelle, ou combinaison d'unités et graduations pourraient être employées avec aiguilles mues par tout mécanisme approprié.

Dans l'exemple de cadran représenté, plus spécialement prévu pour un compteur à gaz, les deux aiguilles de même axe correspondant aux graduations du grand cercle enregistreront la consommation et serviront à la lecture de celle-ci en mètres cubes, tandis que l'aiguille se déplaçant en regard de la graduation circulaire excentrée remplira le rôle du tambour ordinaire de contrôle des compteurs dont la rotation, au débit, est continue et indique la consommation en litres tout en permettant, à la non consommation, d'observer la canalisation en cas de fuites.

REVENDICATION :

Perfectionnement aux mécanismes enregistreurs pour compteurs, consistant en un cadran disposé à la façon d'un cadran de pièce d'horlogerie, et sur lequel se déplacent des aiguilles ayant même axe de rotation, et destinées à indiquer des unités d'ordres différents, ces aiguilles parcourant dans ce but un même cercle principal dont les divisions sont chiffrées, pour constituer deux graduations d'unités d'ordres différents, devant lesquelles évoluent respectivement chacune desdites aiguilles indicatrices.

SOUS-REVENDICATION :

Perfectionnement suivant la revendication, dont le cadran comporte en outre une graduation circulaire excentrée par rapport au cercle principal, et à laquelle correspond une aiguille qui se déplace sur elle pour indiquer des sous-multiples des unités évaluées sur ledit cercle principal.

COMPAGNIE POUR LA FABRICATION
DES COMPTEURS ET MATÉRIEL
D'USINES A GAZ.

Mandataire: A. MATHEY-DORET,
La Chaux-de-Fonds.

ing the tens of the special deliveries (flows), consequently these two pointers rotate in the ratio of one to ten.

A stud 17^1 of the rod 17 passing through the glass 20 enables one to manipulate by its conical cap 18 the head 19 and consequently to reset to zero by hand the pointer 12 as well as the pointer 16 which is integral therewith.

Resumé

The invention has for object a liquid meter and is based on the following principal points:

A liquid meter comprising, aside from the totalizing dial with one pointer, a dial for units designed also for registering fractional flows and possessing two central pointers marking tens and units and capable of being set to zero by hand after each fractional flow without influencing the indications of the totalizer.

Tr/CP.
3/7/36.

(Here follows photostats marked pages 122, 123 and 124.)

125 Translation of Swiss patent no. 51663, class 64, to the firm: Compagnie pour la Fabrication des Compteurs et Materiel d'Usines à Gaz of Paris, France, applied for April 6, 1910, main patent.

Improvement in registering mechanisms for meters

Registering mechanisms for meters are generally constituted either by a series of fixed dials having graduations corresponding to the units which they represent and in front of each of which moves an indicating pointer, set in motion by the meter either by a series of drums or rotating disks carrying on their periphery a graduation the numerals on which pass, in their continuous or intermittent rotary motion, before a small opening or before an index hand permitting the reading.

The first arrangement offers the objection of not permitting an immediate totalization at first glance and by mere reading off; in fact one must read in succession each of the indications carried on the dials representing the units of the various orders, then combine the figures read in order to know the total registered by the mechanism of

the meter. Thus errors are easily committed and that all the more easily since in certain positions of the pointers there is still uncertainty as to the evaluation of the
126 numerals indicated by the latter.

The second arrangement facilitates the reading only when the numerals are perfectly aligned. Now they are only in this situation in the exceptional case since the flow has for effect a constant variation in their respective positions.

Every time that one of them is in movement, reading becomes difficult and errors may occur since during the entire time that this numeral begins to disappear and to yield its place before the opening or index hand to the numeral which follows nothing indicates clearly which of these two figures is the one to be registered.

The present invention has for object an improvement in registering mechanisms for meters consisting in a dial constructed after the manner of a clock dial and over which move pointers having the same rotary shaft and intended to indicate the units of different orders, the pointers, for this purpose, passing around one and the same main circle the divisions of which are numbered so as to constitute two scales of units of different magnitudes before which move along respectively each of the said pointers.

The only figure of the drawing attached hereto
127 shows, by way of example, a dial constructed in accordance with the present invention which may be applied to any type of meters using water, gas, etc., the scales being suitably adapted.

The main circle is divided into ten main divisions, themselves being divided again into ten secondary divisions, the graduated scale having thus 100 equidistant divisions to which correspond two series of numerals arranged on the outside and on the inside of the dial respectively.

The outside numerals which represent the units are marked for fives and the complete scale extends thus over the hundred units passed over in succession by a large pointer in a complete revolution.

The inside numerals are placed opposite principal divisions. That one of them which the small pointer points to as to be registered when we record the flow represents the number of hundreds while the small hand passes a main division every time that the large pointer makes a complete revolution corresponding to 100 units.

In the example shown the small hand indicates 200 and the large one 68, therefore the total is 268 units.

It is to be noted that first of all in this way errors are almost impossible since the reading of the units of lower
order, including the tens, is done directly and without
128 it being necessary to make a comparison between the
respective positions of the pointers of distinct dials
or numerals on indicating drums of the registering mechanisms now in use.

In so far as the evaluation of units of a higher order (hundreds) is concerned any error is avoided as it is sufficient—just like reading the time on a clock—to glance at the pointers, whatever may be their respective positions, to read off the numeral of the amount delivered without hesitation and without it being possible to make an error of a hundred any more than it is possible to make an error of an hour from the dial of a clock.

The units and graduations adopted for the dial shown have evidently been chosen only by way of example, any other scale or combination of units and graduations might be employed with pointers moved by any suitable mechanism.

In the example of the dial shown, more specially provided for a gas meter, the two pointers on the same shaft corresponding to the graduations of the large circle will register the consumption and will serve for the reading of the latter in cubic meters while the pointer moving over the eccentric circulation graduation will play the part of the ordinary
controlling drum of meters the rotation of which,
129 during the flow, is continuous and indicates the con-
sumption in liters while permitting, when there is no
consumption, observing the pipe system in case of leaks.

Claim

An improvement in registering mechanisms for meters, consisting in a dial constructed after the manner of a clock dial and over which move pointers having the same rotary shaft and designed to indicate units of different order, said pointers passing over one and the same main circle for this purpose, the divisions of which are numbered so as to give scales of units of different order before which move along each of the said pointers.

Secondary claim

An improvement, as in main claim, wherein the dial has in addition a circular graduation eccentric to the main circle and which has a pointer which moves over it to indicate sub-multiplies of the units on the main circle.

Tr/CP.
3/7/36.

(Here follows photostats marked pages 130, 131, 132 and 133.)

134 Paper #7

Mailed May 22, 1934

United States Patent Office
Washington, D. C.

In re application of Paul Kollsman,

Serial No. 705642

Filed Jan. 8, 1934

For Quick Reading Indicator

Before the Board of Appeals on Appeal filed May 9, 1934.

EXAMINER'S STATEMENT

The applicant has appealed from the final rejection of claims 1 to 7 inclusive, which are all the claims in the case. The claims are as follows:

1. An aircraft measuring instrument comprising a yielding element operated by a varying force, the intensities of which are to be measured; two dissimilar pointers concentrically rotatable and constrained to rotate in the ratio of ten to one; a single scale graduated in the decimal system and cooperatively concentric with said pointers for the purpose of indicating the said intensities of said varying force; and mechanism operatively connecting both said pointers with said yielding element operatively to rotate said pointers both in the same direction in the ratio of ten to one and in proportion to changes in said varying force.

73-4

705642

16
15.

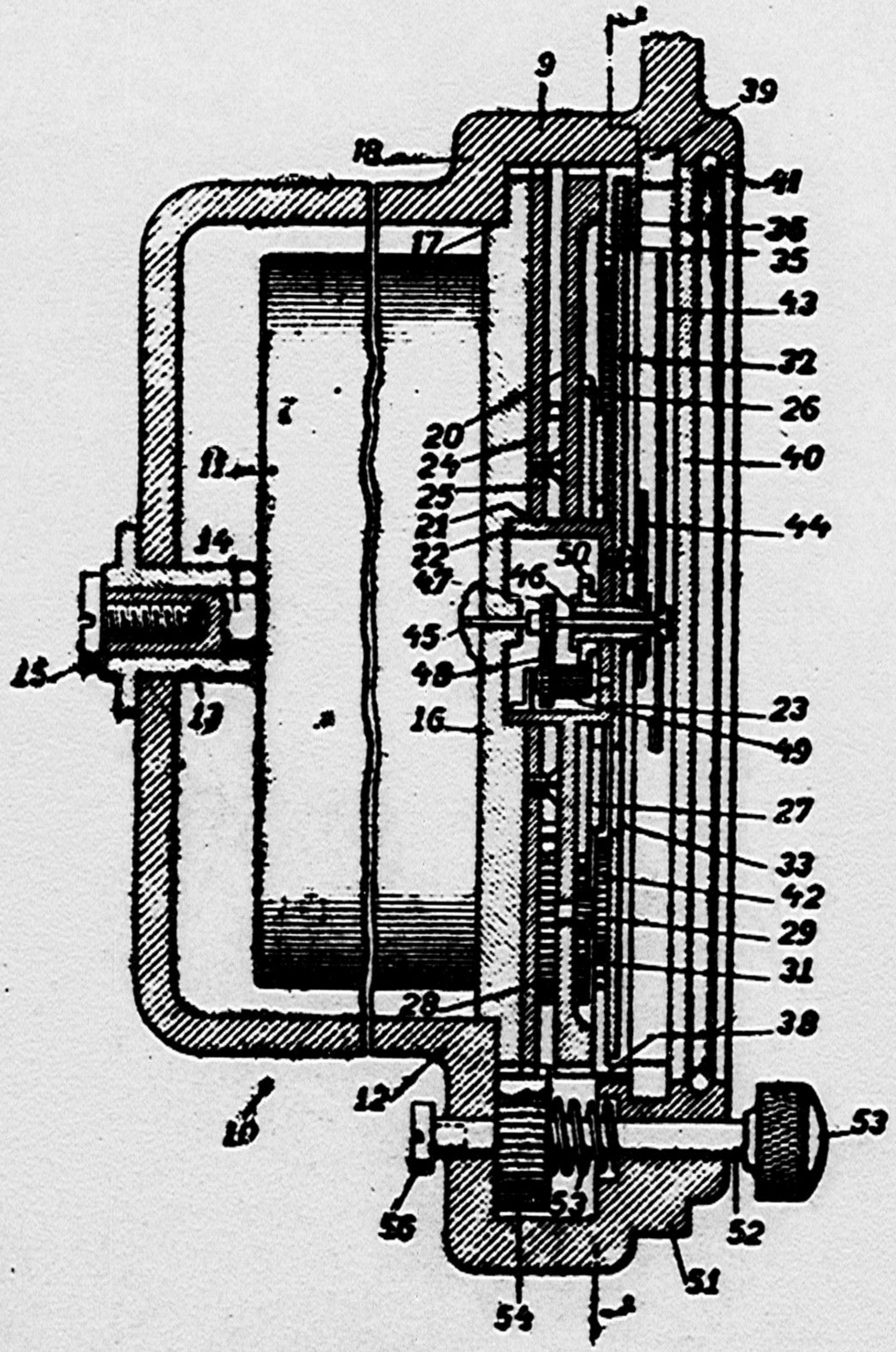


FIG. 1

INVENTOR
PAUL KOLLSMAN
BY
ATTORNEY

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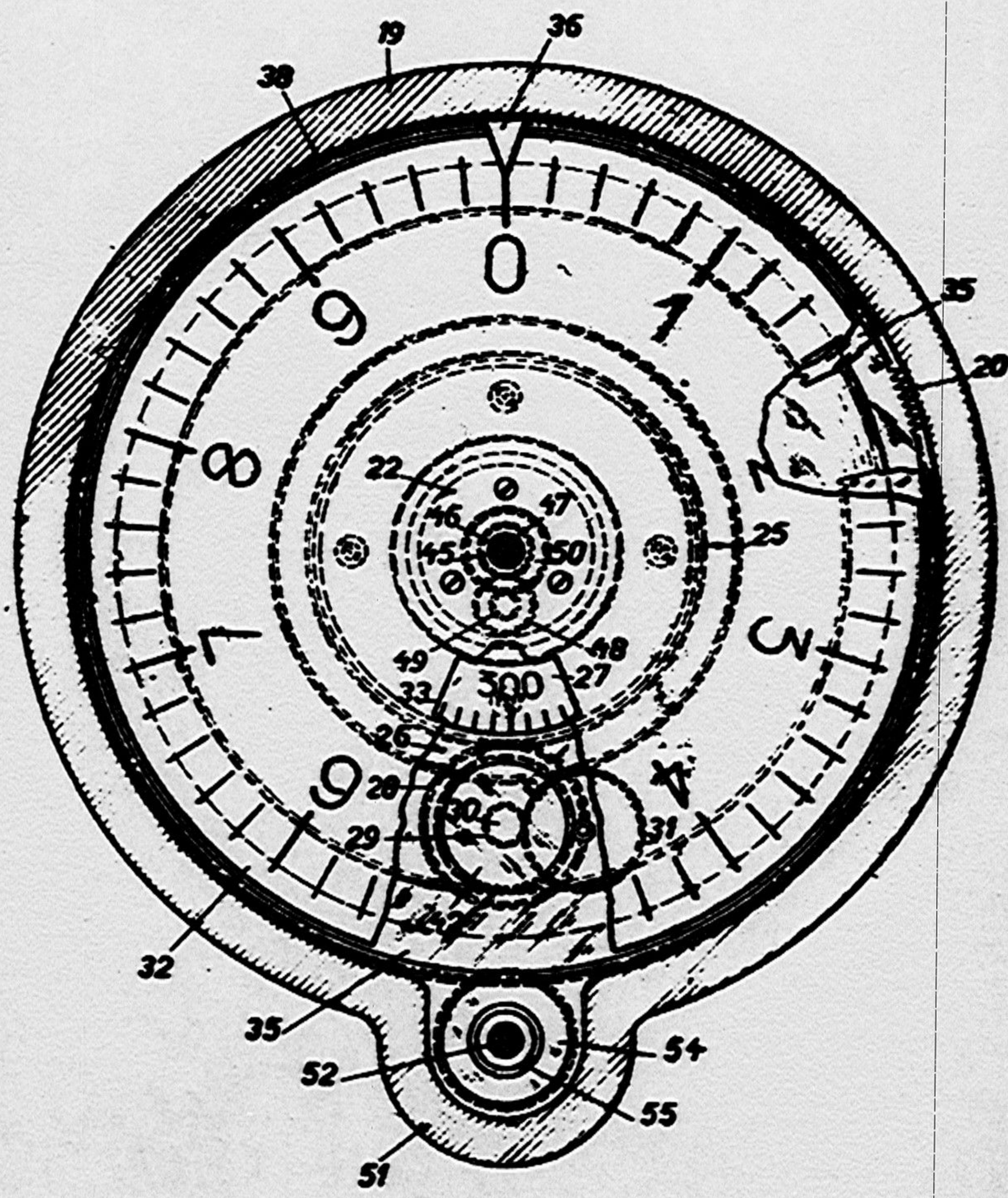

FIG. 2

INVENTOR
PAUL KOLLSMAN
BY
ATTORNEY

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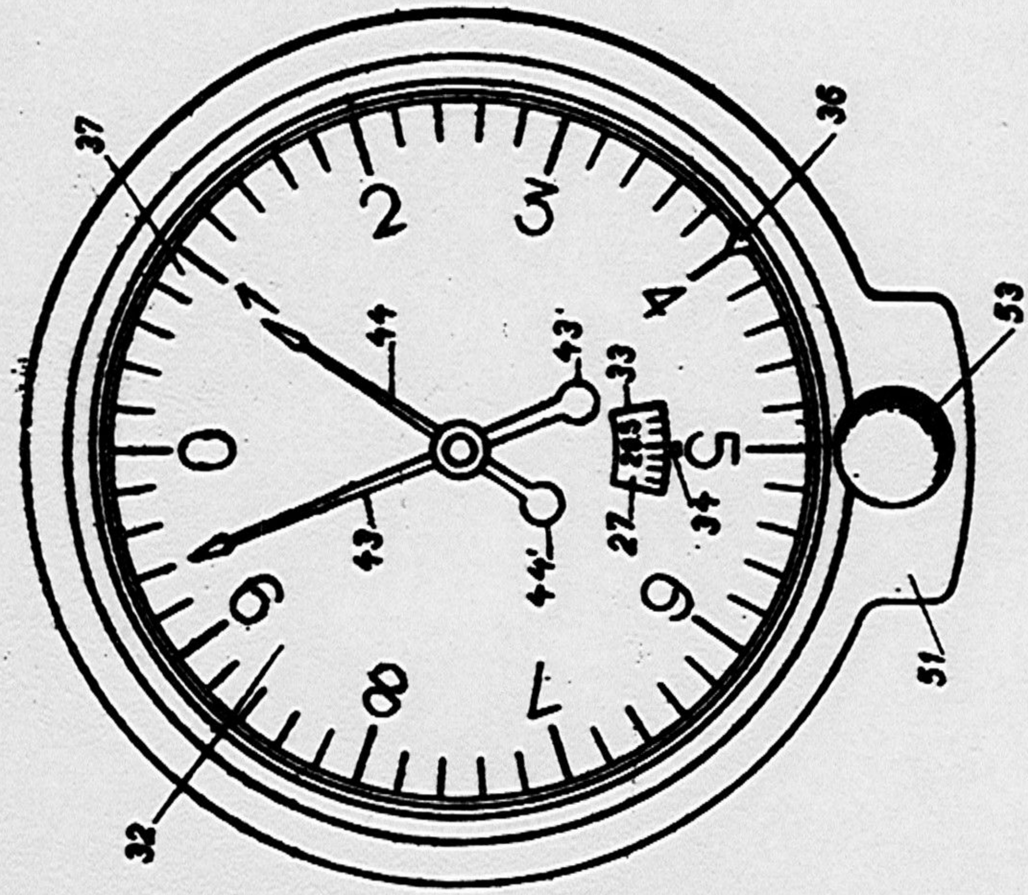

FIG. 4

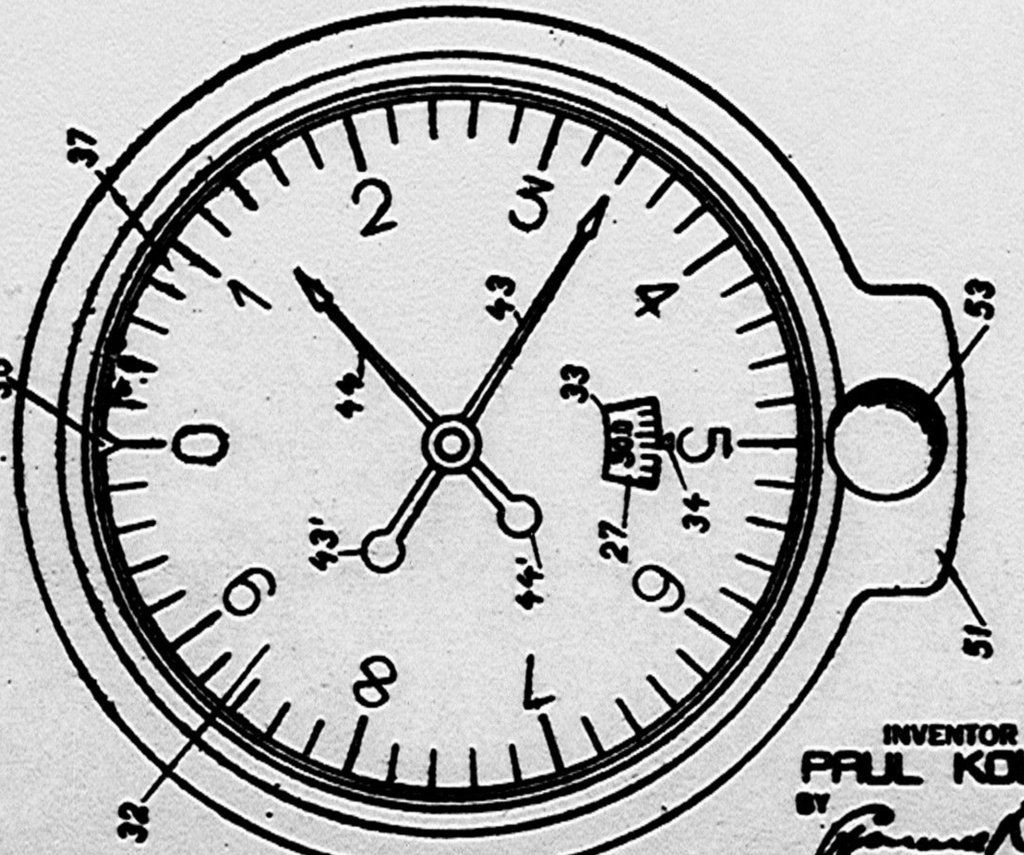

FIG. 3

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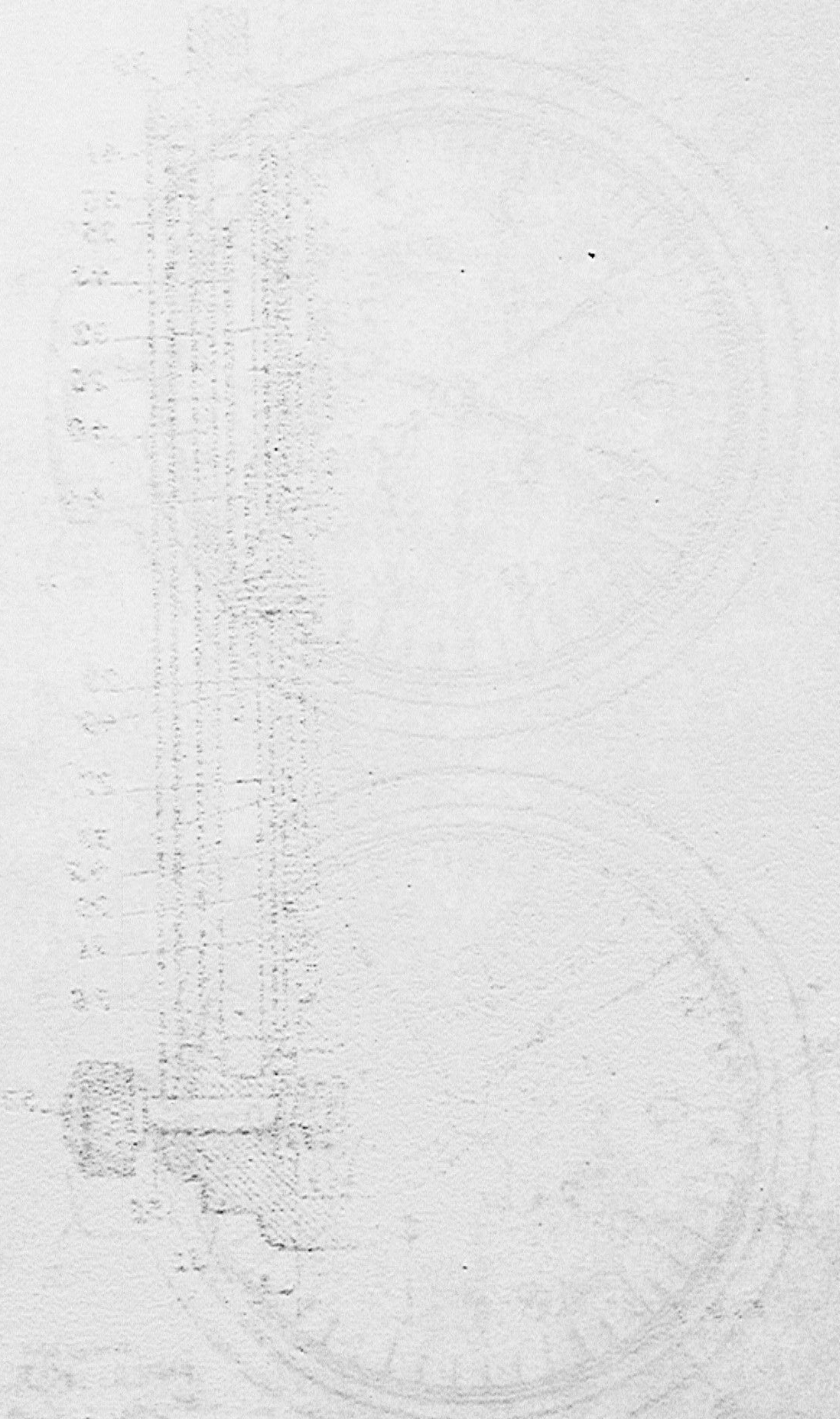
PAUL KOLLSMAN
BY
ATTORNEY



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Sheets - Sheet

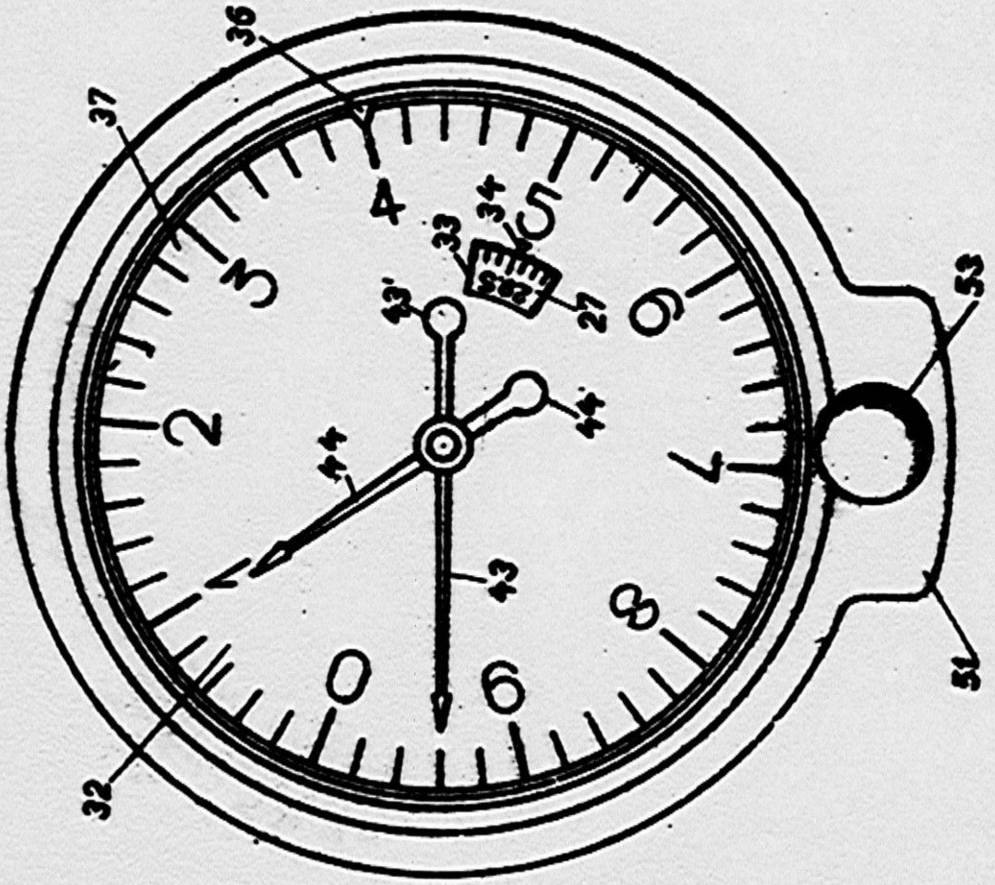

FIG. 6

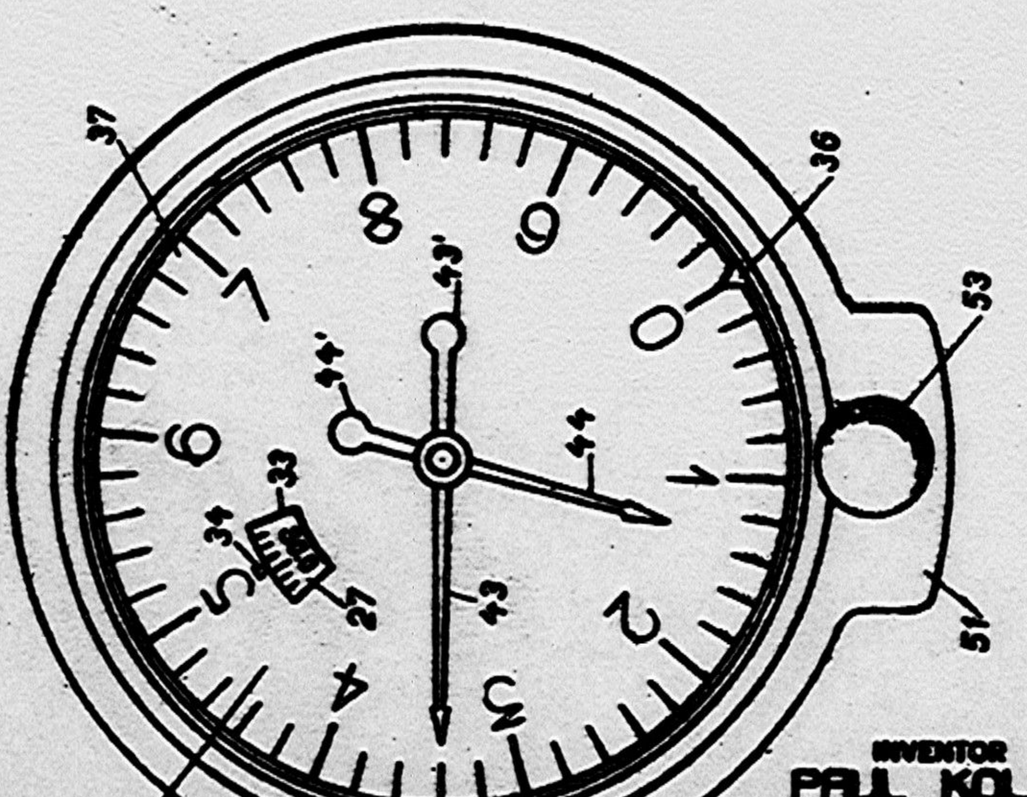

FIG. 5

INVENTOR

PAUL KOLLSMAN

BY

ATTORNEY

2. An aircraft measuring instrument comprising a yielding element operated by a varying force, the intensities of which are to be measured; a dial having a circularly arranged scale; two dissimilar pointers pivoted concentric with said scale, intergeared to rotate in the predetermined ratio of ten to one and cooperating solely with said scale for purposes of indicating the said intensities of said varying force in the decimal system; and mechanism operatively connecting both said pointers with said yielding element operatively to rotate said pointers both in the same direction in said predetermined ratio of rotation and in predetermined accordance with changes in said varying force.

3. An aeroplane measuring instrument having a casing; a dial for said casing having a marginal circular scale having ten major digits uniformly angularly positioned; a plurality of pointers movable in the ratio of one to ten in concentric cooperation with said scale; and means for rotating said pointers in the said one to ten ratio in response to something to be measured and indicated whereby quick readings in a plurality of digits in the decimal system may be made without calculation.

4. An aeroplane measuring instrument having a casing; a dial for said casing having a marginal circular scale having ten major digits uniformly angularly positioned; a plurality of pointers movable in the ratio of one to ten in concentric cooperation with said scale; means for rotating said pointers in the said one to ten ratio in response to something to be measured and indicated whereby quick readings in a plurality of digits in the decimal system may be made without calculation; and manual means for
135 relatively setting said pointers and said scale.

5. An aircraft measuring and indicating instrument comprising a yielding element operated by an external varying condition to be measured and indicated; a plurality of dissimilar pointers concentrically rotatable and constrained to rotate in the ratio of ten to one; a dial having a single scale graduated in the decimal system and cooperatively concentric with said pointers for the purpose of indicating the movements of said yielding element; mechanism operatively connecting said pointers with said yielding element operatively to rotate said pointers in the same direction in the ratio of ten to one and in response to

changes in said yielding element; and an enclosing casing operatively housing all the parts for operation regardless of the direction of the force of gravity.

6. An aircraft measuring and indicating instrument comprising a yielding element operated by an external varying condition to be measured and indicated; a plurality of dissimilar pointers concentrically rotatable and constrained to rotate in the ratio of ten to one, one of which is counterbalanced; a dial having a single scale graduated in the decimal system and cooperatively concentric with said pointers for the purpose of indicating the movements of said yielding element; mechanism operatively connecting said pointers with said yielding element operatively to rotate said pointers in the same direction in the ratio of ten to one and in response to changes in said yielding element; and an enclosing casing operatively housing all the parts for operation regardless of the direction of the force of gravity, and exposing said pointers and said scale for clear visibility.

7. An altimeter having a scale, an indicator, a plurality of pointers movable in the ratio of one to ten by the indicator, said pointers being coordinated with said scale, and the indicator and scale being rotatable relatively to each other.

The references relied upon for rejection are:

Eremeeff,		1,676,983,	(73-4)
Rasch, (Fr. pat.)		475,931,	(73-37)
Kollsman,	reissue	19,079,	(73-4)

The claims are directed to a measuring instrument comprising, a yielding element (an aneroid of a barometer or altimeter) operated by a varying force (atmospheric pressure) the intensity of which is to be measured. Two dissimilar pointers are concentrically rotatable mounted and constrained to move in the ratio of ten to one. The pointers in the drawing are designated by the reference characters 43 and 44.

---

136 because the apparatus of claims 1, 2, 5 and 6 in suit must have the ten to one pointers linked and geared to a forth and back yielding element for their operation a manual rotation of said pointers alone cannot set them in their reading on the dial.

Pointer 43 is mounted on a shaft 45 which is
137 operatively connected to the yielding element (aneroid) through conventional mechanism. Pointer 44 is mounted on a hollow or tubular shaft or hub 46. The shaft 45 extends through the tubular shaft 46 whereby the pointers are concentrically mounted. Interconnecting the two shafts is a gear train consisting of gear 47 secured to shaft 45 which engages the gear 48 mounted on a counter shaft also carrying gear 49, the latter of which engages the gear 50 secured to the tubular shaft 46. The gear ratios of this gear train are such that the pointers are movable in the ratio of ten to one. A single scale 37 graduated with ten major digits is cooperatively concentric with said pointers for the purpose of indicating the intensity of the varying force. The purpose of having two concentrically rotatably mounted dissimilar pointers rotatable in the ratio of ten to one is to have one pointer make ten revolutions to one revolution of the other thereby having one pointer move at a much higher rate of speed than the other in response to movements of the yielding element (aneroid). For example, one revolution of the high speed pointer may represent 1000 feet altitude and one revolution of the slow speed pointer may represent 10,000 feet altitude. The purpose of having a single scale graduated in ten major digits is to facilitate reading the pointers movable thereover. For example, if the slow speed pointer (the short pointer 44) registers somewhere between "2" and "3" digits on the single scale and the high speed pointer (the long pointer 44) registers "5", a glance at the pointers instantly indicates 2500 feet. This registration instantly indicates altitude in accordance with the decimal system with the accuracy of a sensitive pointer and all the necessary range of a slow speed pointer.

Claims 1 to 6 inclusive were rejected for the reason that they cover the same subject matter as included in claim 13 of applicant's original application and which was
138 deliberately cancelled in order to obviate the art cited there-against and obtain a patent. Hence, there was no inadvertence that would entitle applicant to these claims under a reissue. Ex parte Hoiland, 285 O. G. 391. It is true in this case, as the Court remarked in ex parte Hoiland, that "the canceled claims were not precisely the same in

scope as claims 1 to 7 (viz. the claims canceled in the original application) but they were for substantially the same invention, and having deliberately canceled claims to this subject matter applicant is not in a position to now assert that there has been an inadvertence, accident or mistake such as will support a reissue''.

Original claim 13 was drawn to ''an altimeter having a plurality of pointers, a common scale therefor, and means for moving the pointers in the ratio of ten to one''. This claim was withdrawn in favor of another claim (38) which recited the 10 to 1 pointer ratio, but this was, so far as patentability of the substitute claim was concerned, mere surplusage, for the 10 to 1 ratio was not relied upon for patentability, nor did it lend patentability to the new claim, but the patentable matter of the substitute claim 38 resided in the provision of the *reference means movable relative to the dial, the plurality of dials,* and the scales thereon increasing in *opposite* directions. This is all apparent and emphasized in the argument accompanying the substitute claim 38.

Now it is apparent at a glance that the proposed reissue claims 1 to 6 have more words than the original claim 13 which was withdrawn but the new claims include nothing more than an increase in words over original claim 13, or simply tag in and elaborate upon elements which all altimeters have and necessarily must have. For instance claim 1 introduces the yielding element, which is the
139 aneroid, capsule, bellows or collapsible unit present in every altimeter ever made of the aneroid type. The next element introduced in the claim not specifically recited in original claim 13 is the transmission from aneroid or pressure responsive element to pointers, and here again we have but a positive recitation of a structure necessary and implied in canceled claim 13. Anyone who should produce an altimeter without having a yielding or atmospheric pressure responsive element and/or transmission therefrom to the pointers would contribute something revolutionary indeed.

The remaining claims may be similarly analyzed. Claim 3 for instance adds a casing for the altimeter. The Examiner has never heard of one not being housed. In fact throughout the gamut of measuring instruments casings are recognized essentials.

As stated in ex parte Hoiland above, the canceled claim to bar allowance in a reissue need not be "precisely the same" as in the reissue, but only of "substantially the same" scope; ex parte White, 366 O. G. 697 is to the same effect. Later, in Rim Co. v. Firestone 381 O. G. 3 the Circuit Court of Appeals for 6th Circuit, in a case involving the question here presented held that cancelation of an original claim does not prevent reissue to obtain a "more limited and therefore different claim". The Court held that there must be a "materially different" claim, and the Court emphasized, "is not to be found merely in a choice of words, which may not imply a different, nor in *trifles,* which may not be material". It seems to the Examiner as a corallary to the Court's remarks about "trifles", that even the inclusion of an essential element of an altimeter with the view of lending patentability to a reissue claim is in effect only a "trifle" where that element is conventional, and recognized and implied as a necessary unit of all altimeters. It is but a subterfuge to make a claim look
140 different and read differently, to cover the same concept. The applicant had just as well revamped claim 13 to recite that the device is made of metal.

(2) Claims 1 to 7 inclusive were further rejected as unpatentable over Eremeeff. Eremeeff shows it to be old to mount two dissimilar pointers concentrically to rotate in the ratio of four to one over a single scale graduated in ten major digits. The pointers are interconnected by a gear train which in turn is operatively connected to an aneroid. It is held not to involve invention to change the ratio of rotation of the pointers, if so desired. All that would be required to accomplish this result is the changing of the gear ratios of the gears rotating the two pointers. This would come within the skill of a mechanic.

(3) Claims 1 to 7, inclusive were still further rejected as unpatentable over Eremeeff in view of Rasch. Eremeeff shows it to be old to mount two dissimilar pointers concentrically to rotate in a given ratio. Rasch shows it to be old to provide for a plurality of concentrically mounted pointers rotatable in the ratio of ten to one. Therefore, it is held not to be a matter of invention to adopt a gear ratio for the gear train for rotating the pointers of Eremeeff to cause the pointers to move in the ratio of ten to one the same as Rasch has done.

(4) Claim 7 stands further rejected on the ground of double patenting, the subject matter of this claim being indivisible from claim 37 of applicant's reissue patent 19,079.

This claim, while not regarded as patentable per se, as indicated above, is a verbatim copy of claim 37 of the original patent. It should be noted that in applying for reissue applicant divided his original patent, upon his own motion, into three reissue applications. One has resulted in reissue patent 19,079, and the instant application is the/another
141 of the applications.

In the reissue application resulting in patent 19,079 applicant has patented as claim 37 an organization very nearly the same as claim 7 of this application (viz. original patent claim 37). Claim 37 of reissue patent 19,079 recites the indicator, pointers, and setting means. Claim 7 of this application likewise recites the indicator and pointers, and that the indicator and scale are "rotatable relatively to each other", which is for the purpose of setting. It should be remarked also, that both claim 37 of the patent 19,079, and claim 7 of this application are generic and cross read, and that they are both based upon identical disclosures. There is, then, but one invention and no room for division. There being but one invention there can be but one patent.

The Examiner is not unmindful of the fact that all divisions of a reissue expire at the same time, and thus the allowance of overlapping claims of this nature will not literally extend the monopoly; but at best such divisions can only lead to confusion and have no basis in law or reason. It may be true that a patent issued with, say 10 claims, to a single invention, if reissued as 10 separate patents each with one of the claims, would not extend the monopoly, but it would confuse the monopoly and the records of this office.

Respectfully submitted,

A. D. McFADYEN,
Examiner, Div. 36.

Kampe:mwc

142 Appeal No. 11,869 Paper No. 12

Decision.

U. S. Patent Office

Board of Appeals

Mailed Sep 20 1934

Appeal No. 11,869 REH

Hearing:
September 6, 1934

In the United States Patent Office

Before the Board of Appeals

Ex parte Paul Kollsman

Application for Patent filed January 8, 1934, Serial No. 705,642 for the reissue of Patent No. 1,857,311 granted May 10, 1932. Quick Reading Indicator.

Mr. Leonard Day for applicant.

This is an appeal from the action of the primary examiner finally rejecting claims 1-7 inclusive.

Claim 1 is representative of the subject matter involved.

1. An aircraft measuring instrument comprising a yielding element operated by a varying force, the intensities of which are to be measured; two dissimilar pointers concentrically rotatable and constrained to rotate in the ratio of ten to one; a single scale graduated in the decimal system and cooperatively concentric with said pointers for the purpose of indicating the said intensities of said varying force; and mechanism operatively connecting both said pointers with said yielding element operatively to rotate said pointers both in the same direction in the ratio of ten to one and in proportion to changes in said varying force.

The references relied upon by the examiner are:

143	Rasch (French),	475,931	Apr. 6, 1915,
	Eremeeff,	1,676,983,	July 10, 1928,
	Kollsman,	Re. 19,079,	Feb. 13, 1934.

This application relates to the use of an aircraft instrument having a single scale for cooperation with two pointers arranged to travel at a ratio of 1:10.

The patent to Eremeeff discloses a similar instrument in which the pointers travel at a ratio of 1:4. The French patent shows a gas measuring instrument in which pointers travel at the 1:10 ratio. In this patent scales are provided for each pointer.

We are convinced that it would not involve invention to employ a single scale for all of the pointers in the French patent and we also believe that it would be obvious to employ the 1:10 ratio in the Eremeeff instrument. If any suggestion was necessary in modifying the latter instrument, we consider that the disclosure of the French patent is pertinent even though the measuring instrument of that patent is not intended to be used for measuring a varying force on an airplane.

Claims 1-6 have been rejected as not patentably distinguishing from claim 13 which was cancelled in the original application of which this application is a reissue. Appealed claim 7 was allowed in the original patent and while somewhat more specific than the canceled claim 13, we believe that it is at least as broad as any of the other claims involved in this appeal. It is our opinion, therefore, that appellant is not estopped as to the remaining claims by his cancellation of the original claim 13.

Claim 7 is also rejected as substantially of the
144 same nature as claim 37 in appellant's granted reissue.
This claim 37 contains a limitation with regard to a setting means which is not found in appealed claim 7 and we consider that it should not be assumed that this limitation is immaterial in a patent claim. It is our view that claim 7 should not be rejected for this reason.

The decision of the examiner is affirmed in holding that the subject matter of all of the appealed claims is unpatentable over the art and his decision is reversed as to the other grounds of rejection.

LESLIE FRAZER,
Assistant Commissioner,

W. L. REDROW,
Examiner-in-Chief,

W. L. THURBER,
Examiner-in-Chief,

Board of Appeals.

September 20, 1934

145 Appeal No. 11,869 Paper No. 14

Decision.

U. S. Patent Office

Board of Appeals

Mailed Oct 22 1934

Appeal No. 11,869 REH

In the United States Patent Office

Before the Board of Appeals

Ex parte Paul Kollsman

Application for Patent filed January 8, 1934, Serial No. 705,642 for the reissue of Patent No. 1,857,311 granted May 10, 1932. Quick Reading Indicator.
Mr. Leonard Day for applicant.

Petition for Reconsideration

Appellant petitions for reconsideration in the appeal decided September 20, 1934.

He particularly calls our attention to the fact that the references are not airplane instruments, that he offered to supply affidavits from leading pilots to show the revolutionary nature of the change when applied to airplane instruments and also that a certain decision, cited by him, he regards as particularly pertinent with respect to this appeal.

We have not questioned the advantage which flows from the use of appellant's dial with airplane instruments 146 but in view of the state of the art, we were forced to the conclusion that appellant's contribution was an obvious one. If his quick-reading dial is not patentable when employed on the ground, we are convinced that it does not become so when taken into the air, merely because the importance of quick-reading is greater.

As to the cited decision, of course each case must rest upon its own merits and we are not convinced that the Court which decided the case referred to would have found the matter claimed in this appeal patentable in view of the state of the art. We note that the Court stated that the art relied upon by the examiner was non-analogous and in our opinion the dials on the measuring instruments cited here would be regarded as analogous by those skilled in the measuring art. We think it highly probable that the Court would not make the same statement with respect to the relationship of the arts in the situation before us. There are also various other statements to be found in the decision which we believe indicate that the Court may have been influenced by facts and conditions which are not the same in this case.

We are still of the opinion that the position taken by us was the proper one and the petition is therefore denied.

LESLIE FRAZER,
Assistant Commissioner,

W. L. REDROW,
Examiner-in-Chief,

W. L. THURBER,
Examiner-in-Chief,

Board of Appeals.

October 22, 1934

147 Equity 58,618

PAUL KOLLSMAN, *Plaintiff Appellant,*

vs.

CONWAY P. COE, Commissioner of Patents,
Defendant Appellee

On motion of Paul Kollsman, by his attorney, Leonard Day, and It appearing by stipulation between the attorneys for the respective parties that, in Plaintiff's Exhibit 1, the prints of the drawing as originally filed (found immediately preceeding paper No. 2) and papers 3, 4, 5, 8, 10, 11 and 15 thereof are not necessary for a consideration of the issue of this cause; and that Plaintiff's Exhibit 2—Printed Copy of Plaintiff's Original Patent; Exhibit 5—Plaintiff's (commercial) instrument; Exhibit 6—Plaintiff's commercial instrument, open; Exhibit 7—Plaintiff's catalog; Exhibit 8—Defendant's letter; Exhibit 9—Eremeef model; Exhibit 11—first bundle prior art; and Exhibit 12—second bundle prior art, may be considered by this Court adequately as physical exhibits and that the printing thereof as a part of the record would occasion undue expense. It is hereby ordered that the aforesaid parts of Plaintiff's Exhibit 1 and Plaintiff's Exhibits 2, 5, 6, 7, 8, 9, 11, and 12 are acceptable as physical exhibits and that the printing thereof as a part of the record be and the same hereby is dispensed with.

Dated Washington, D. C. BY THE COURT

May 20, 1936. GEORGE E. MARTIN,
Chief Justice.

Consented to W. W. Cochran, Attorney for Defendant Appellee.

Endorsed on Cover: District Court of the United States, District of Columbia. No. 6784. Paul Kollsman, Appellant, vs. Conway P. Coe, Commissioner of Patents. United States Court of Appeals for the District of Columbia. Filed Jul. 15, 1936. Moncure Burke, Clerk.

UNITED STATES
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DISTRICT OF COLUMBI
FILED OCT 16 1936
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UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA

April Term, 1936

No. 6784

PAUL KOLLSMAN
Appellant
v.
CONWAY P. COE, Commissioner of Patents

BRIEF FOR APPELLANT KOLLSMAN

LEONARD DAY
Solicitor for Appellant
New York City
Washington, D. C.

Appeal Printing Co., Inc., 130 Cedar St., N. Y. - WOrth 2-3242

INDEX

PAGE

Introduction 1

Rejected Claims Under Appeal 3

Rejected Claims Not Appealed 4

Kollsman's Altimeter 5

Kollsman Made Meritorious Invention Over Prior Art 9

Eremeeff Patent—Defendant's Exhibit A 10

Courts Rightfully Sustain the Kollsman Type of Invention 15

Later Decisions Similar 16

The Sustaining of an Invention Such as that of Kollsman has the Approval of the Supreme Court of the United States 17

Clear Cut Issue 18

Conclusion 19

Citations

Lucke *v.* Coe, 20 U. S. Pat. Q. 178 16

Otto *v.* Robertson, 66 F. (2d) 213; 18 U. S. Pat. Q. 111 15

Potts *v.* Craeger, 155 U. S. 597, 607, 608; 15 Sup. Ct. 194; 39 L. Ed. 275 17

Wach *v.* Coe, 25 U. S. Pat. Q. 25 16

UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA

Paul Kollsman,
Appellant,
v.
Conway P. Coe, Commissioner of Patents.

Appeal No. 6784

BRIEF FOR APPELLANT

INTRODUCTION

This is a suit under Section 4915, R. S., 35 U. S. C. A. 63, based upon a decision of the Board of Appeals of the United States Patent Office reversed as to Claim 7 by Judge Bailey of the District Court of the United States for the District of Columbia and followed by him as to Claims 1 to 6, rejecting all said claims as hereinafter set forth, which claims were made in Divisional Reissue Application Serial No. 705,642, filed January 8, 1934, for "Quick Reading Indicator", being a division of Reissue Application Serial No. 639,897, filed October 27, 1932, as a Reissue Application of Patent No. 1,857,311, issued May 10, 1932, to Paul Kollsman, plaintiff-appellant.

The claims under appeal are embodied in a sensitive altimeter having a rotating large pointer reading accurately on a concentric scale bearing dial and also a concentrically rotating small pointer indicating on the same scale elevational changes in ten times the amount of the large pointer; an aneroid capsule having an expansion and contraction in response to varying atmospheric pressure of about one-twentieth of an inch is operatively connected directly to the spindle of the large pointer and planetary gearing operated from the spindle of the large pointer rotates the small pointer one-tenth the rotation of the large pointer in the same direction of rotation either clockwise or counter-clockwise for ascent or descent. This planetary gearing also effects a compensating correction on the dial for the small pointer when the instrument is set by rotating the dial relatively to its case and the operating aneroid mechanism and a reference marker used to designate the setting elevation. Thus two pointers constrained always to be operatively connected to a delicate yielding element responsive to indicate variations in an external force give instantaneous readings in the decimal system of foot altitude and permit of the manual setting functioning of the instrument without destruction of the delicate yielding element or the introduction of an error in the constantly maintained accurate designation of instantaneous constantly changing altitude.

The sole issue is that of invention over specified aggregations of the prior art.

Rejected Claims Under Appeal

Claim 1. An aircraft measuring instrument comprising a yielding element operated by a varying force, the intensities of which are to be measured; two dissimilar pointers concentrically rotatable and constrained to rotate in the ratio of ten to one; a single scale graduated in the decimal system and cooperatively concentric with said pointers for the purpose of indicating the said intensities of said varying force; and mechanism operatively connecting both said pointers with said yielding element operatively to rotate said pointers both in the same direction in the ratio of ten to one and in proportion to changes in said varying force.

Claim 2. An aircraft measuring instrument comprising a yielding element operated by a varying force, the intensities of which are to be measured; a dial having a circularly arranged scale; two dissimilar pointers pivoted concentric with said scale, intergeared to rotate in the predetermined ratio of ten to one and cooperating solely with said scale for purposes of indicating the said intensities of said varying force in the decimal system; and mechanism operatively connecting both said pointers with said yielding element operatively to rotate said pointers both in the same direction in said predetermined ratio of rotation and in predetermined accordance with changes in said varying force.

Claim 5. An aircraft measuring and indicating instrument comprising a yielding element operated by an external varying condition to be measured and indicated; a plurality of dissimilar pointers concentrically rotatable and constrained to rotate in the ratio of ten to one; a dial having a single scale graduated in the decimal system and cooperatively concentric with said pointers for the purpose of indicating the movements of said yielding element; mechanism operatively connecting said pointers with said yielding element operatively to rotate said pointers in the same direction in the ratio of ten to one and in response to changes in said yielding element; and an enclosing casing operatively housing all the parts for operation regardless of the direction of the force of gravity.

Claim 6. An aircraft measuring and indicating instrument comprising a yielding element operated by an external varying condition to be measured and indicated; a plurality of dissimilar pointers concentrically rotatable and constrained to rotate in the ratio of ten to one, one of which is counter-balanced; a dial having a single scale graduated in the decimal system and cooperatively concentric with said pointers for the purpose of indicating the movements of said yielding element; mechanism operatively connecting said pointers with said yielding element operatively to rotate said pointers in the same direction in the ratio of ten to one and in response to changes in said yielding element; and an enclosing casing operatively housing all the parts for operation regardless of the direction of the force of gravity, and exposing said pointers and said scale for clear visibility.

Rejected Claims Not Appealed

Claim 3. An aeroplane measuring instrument having a casing; a dial for said casing having a marginal circular scale having ten major digits uniformly angularly positioned; a plurality of pointers movable in the ratio of one to ten in concentric cooperation with said scale; and means for rotating said pointers in the said one to ten ratio in response to something to be measured and indicated whereby quick readings in a plurality of digits in the decimal system may be made without calculation.

Claim 4. An aeroplane measuring instrument having a casing; a dial for said casing having a marginal circular scale having ten major digits uniformly angularly positioned; a plurality of pointers movable in the ratio of one to ten in concentric cooperation with said scale; means for rotating said pointers in the said one to ten ratio in response to something to be measured and indicated whereby quick readings in a plurality of digits in the decimal system may be made without calculation; and manual means for relatively setting said pointers and said scale.

Claim 7. An altimeter having a scale, an indicator, a plurality of pointers movable in the ratio of one to ten by the indicator, said pointers being coordinated with said scale, and the indicator and scale being rotatable relatively to each other.

Of the above claims, claim 7 was allowed by Justice Bailey of the District Court of the United States for the District of Columbia over the rejection by the Board of Appeals of the Patent Office.

Kollsman's Altimeter

Fig. 3 (Tr. p. 64) shows the appearance of the Kollsman altimeter on the instrument board when the plane is flying at an elevation of 1,340 feet relatively to sea level. On this instrument the scale 37 always designates by means of the sensitive pointer 43 and the range pointer 44 the instantaneous altitude of the plane above that level at which the instrument has been set (here—sea level). The reference marker 36 indicates likewise on the same scale 37 the reference altitude relatively to which the instrument is set. Thus, in Fig. 3 the reference marker 36 pointing to zero, the instrument is set to read altitude above sea level. A second reference marker 27, 34 correspondingly indicates the reference level in terms of atmospheric pressure at sea level. The dial is marked off in equal major divisions from 1 to 10(0) with five subdivisions for each major division. Each major division is 100 feet of altitude. The large pointer 43 points to the second subdivision beyond the 300 feet mark and the small one to ten ratio pointer 44 points to a position part way between the numeral 1 and the numeral 2. This instrument therefore at a glance reads 1,300+ feet above sea level. The sensitive pointer 43 is constantly visibly moving in accord with the elevational changes of the aeroplane. It moves clockwise for an ascent and counter-clockwise for a descent.

When flying blind as in a fog and in the vicinity of mountains, it is expedient to set the altimeter to read zero at the known elevation of the dangerous mountain so that the reading of the altimeter shall indicate the elevation above the danger point. It is also useful to set the altimeter for zero at the elevation of a landing field, particularly when a blind landing is to be made.

For example, assuming that the landing field is 400 feet above sea level or that the pilot has obtained the actual barometric pressure at this landing field which accords with 400 feet above sea level, the pilot then manipulates knob 53, see Fig. 3 (Tr. p. 64), until the reference marker 36 indicates 4 on the scale 37, or until the reference marker 34 indicates the barometric pressure 29.5. It should then be noted that the pointers 43 and 44 no longer indicate

1,340 feet above sea level, but instead 400 feet less or 940 feet above the landing field. In this indication the slow moving range pointer 44 indicates less than 1,000 feet and the constantly moving sensitive pointer 43 indicates 940 feet. When the landing field is reached, both pointer 43 and pointer 44 having rotated counter-clockwise to indicate zero, the sensitive pointer with great accuracy indicating small increments of descent.

Fig. 1 (Tr. p. 62) best shows the coordination of parts by means of which this extremely delicate mechanism is caused to indicate with great accuracy.

The spindle 45 is operatively directly geared to the expansible and contractable aneroid capsule to rotate angular amounts in proportion to actual changes in elevation measured in feet. This spindle carries the sensitive pointer 43. All the aneroid mechanism, including the aneroid itself, is fixed in the sub-housing 11, which, in turn, is fixed to the big gear 16 frictionally held in the outer casing 10. Also normally frictionally held against rotation is the big gear 24 lying against the big gear 16. This is likewise true for the third big gear 20. All of these big gears require considerable manual effort to move them against their normal friction and it is these gears and these gears alone which are manipulated by the finger knob 53 with its drive pinion 54 for the purpose of setting the instrument. In this setting manipulation no strain can be applied to the very delicate pointer mechanism of which the accurate reading pointer 43 is directly coupled to the yielding element.

One of the ways in which the instrument is settable to read zero on a landing field is to pull out the knob 53 and cause the pinion 54 to rotate solely the gear 20. This rotates the dial relatively to the casing, relatively to the reference marker and relatively to the aneroid mechanism, big gears 16 and 24 standing still from friction.

This relative setting movement, so far as the sensitive pointer 43 is concerned, subtracts out by a clockwise rotation of scale 37 the positive setting indication of the reference marker 36 because they both read in the same digit of the decimal system and are both rotated relatively to pointer 43. The range pointer 44, however, reading in the next higher digit of the decimal system requires compensation on the rotated scale. This compensation is effected by revolving the planetary axis of gears 48 and 49. The axis of these gears is journaled in the hollow hub of the setting gear 20 which likewise carries the dial 32 bearing scale 37. At this point it is important to point out in addition to this provision for correcting the reading of the range pointer 44 the fact that the 1 to 10 gearing for range pointer 44 is gearing driven in the first instance from spindle 45 itself in such a way that 1 complete rotation of sensitive pointer 43 directly carried by spindle 45 causes 1/10th of a rotation of range pointer 44 for a stationary position of the planetary axis. A shifting of the planetary axis imparts no strain upon the delicate aneroid capsule but merely establishes for each setting a corrected fulcrum (axis of rotation) for the uninterrupted operation of the range pointer from the sensitive pointer and constantly so as to read in the decimal system. Even during the time that the instrument is being set manually by a manipulation of the setting pinion 54, there is no interruption of and no disturbance of the sensitive varying indicational positioning imparted to the pointers by the delicate aneroid capsule.

Kollsman Made Meritorious Invention Over Prior Art

The Board in its decision relied upon the patent to Eremeeff (Tr. pp. 69-73), in which a spindle was rotated in either of two directions in response to a barometric pressure operated bellows. This spindle carried two gears of different sizes, which in turn drove two indicating pointers in the rotational ratio of 4 to 1 to each other. The Board aggregated to this 4 to 1 altimeter a gas flow meter publication in the form of French patent 475,931 (Tr. p. 8). At the trial, however, the Solicitor for the Commissioner of Patents produced three more patents, a cash register patent, Exhibit B (Tr. p. 68), a French patent, Exhibit D (Tr. p. 68), and a Swiss patent, Exhibit E (Tr. p. 68), D and E being water meter patents to show dials and pointers operating in a 10 to 1 ratio. Plaintiff-appellant contended that the issue was not discovery of the decimal system or discovery that it was well to have pointers rotate in a 10 to 1 ratio and introduced as physical exhibits many other 10 to 1 rotating pointers indicating relatively to dials in mechanisms non-analogous to the invention at issue and each of which had received a patent (Tr. pp. 19-21). Plaintiff-appellant contended that the invention was the production of an aeroplane instrument in which a varying external force first operated upon a yielding element and in which that yielding element was operatively coupled to indicate instantaneously in two digits of the decimal system on a dial and which complete aeroplane instrument was free to be operated and to function as such without interfering with the delicate indication operating parts and without destroying their true continuous indication of the degree of the external force (barometric pressure) to be indicated. None of the prior art utilizing the 10 to 1 rotation of pointers is operated from a yielding element responsive to the variations of an external force.

The very altimeter patent defendant's Exhibit A, Eremeeff's Patent, is persuasive of the belief of all designers before Kollsman that this instantaneous decimal system reading feature could not be embodied in an instrument such as an altimeter. Eremeeff was capable of producing only four rotations of his sensitive pointer and a contemporaneous single rotation of his range pointer. As was brought out by the witness Angst, there is not any invention in designing 10 to 1 gears, but there was invention in producing the untrammeled free rotation of a sensitive pointer over a great many rotations (more than four) and at the same time rotate a range pointer 1/10th as many so that the two together would indicate altitude instantaneously in an altimeter in two digits of the decimal system.

Eremeeff Patent—Defendant's Exhibit A

Before going into a detailed discussion of the Eremeeff barometric device which failed to indicate altitude in two units of the decimal system, it is illuminating to take note of the fact that as late as 1910 it was considered an invention in Switzerland to cause a water flow meter to read from two pointers in two digits of the decimal system on a single scale. See Defendant's Exhibit E (Tr. pp. 87-94).

Before Kollsman it was usually customary to indicate altitude in aeroplane instruments by means of a single pointer such as the pointer 86 shown in Figs. 4 and 5 of Eremeeff (Tr. p. 70). Such a pointer being operated from a delicate yielding element such as Eremeeff bellows 66 presented difficulties particularly in that the total expansion and contraction of the bellows was slight. In these figures of the Eremeeff patent the expansion and contraction of the bellows is multiplied by the bell crank lever arrangement 77, 80, which lever arrangement is effective to cause only one rotation of the single pointer 86 against the retractile effort of the hair spring 85′. The reverse of this rotation is effected by the spring means for a descent of the aeroplane. Although Eremeeff recites this Fig. 4—Fig. 5 construction as a slightly modified form of his invention, it is in reality a good example of the difficulties presented when one harnesses a yielding element which is operated by the variations of an external force such as the pressure of the atmosphere.

In Figs. 1, 2 and 3 of the Eremeeff Patent (Tr. p. 69) Eremeeff attempted to cause his barometric device to give readable indications by means of a sensitive pointer 47 and a range pointer 48. It is interesting to note how he did it and how little he accomplished. He coupled his bellows 27 by means of a chain 36 wrapped around a shaft 35 so that when the bellows collapsed it would tend to rotate this shaft. In addition he fixed one end of a tension spring 41 and operatively connected the other end of this spring through a chain 40 wrapped around the same shaft 35 in the opposite direction. In this way the spring 41 tended to rotate the shaft 45 in one direction as the bellows 27 were permitted to expand as the aeroplane ascended and the increased pressure of the atmosphere collapsed the bellows 27 to cause the shaft 35 to rotate in the other sense as the aeroplane descended. To the shaft 35 Eremeeff fixed two gears 38 and 39 and to the respective shafts of the pointers 47 and 48 he fixed two other gears, 50 to mesh with gear 38 and 49 to mesh with gear 39. Eremeeff states that the limitations of this kind of apparatus permitted him to drive the sensitive pointer 47 only throughout four rotations during which four rotations the range pointer 48 could make and did make but one rotation. He also stated that, if the instrument were to be used to indicate aeroplane flights above 4,000 feet, one should open up the interior of the bellows to the atmosphere causing the pointers to return to zero so that the instrument could start over again and indicate another 4,000 feet above the first four thousand feet, which the pilot would have to keep in his mind so as to remember that when the instrument indicated in its second increment of operation 1,000 feet it really meant 5,000 feet.

Now let us examine the great confusion into which Eremeeff entered in his attempt to use two pointers. Fig. 2 of his patent shows the indication of the pointers for 1,000 feet, but in this showing the range pointer 48 is indicating 2½ of something while the sensitive pointer 47 is indicating 10 of something (hundredths of feet). We find his instrument indicating, therefore, ten hundredths of feet with one pointer and 2½ units four times as great as hundredths of feet with the range pointer. For the pilot to determine accurately what this is indicating, he must remember the 4 to 1 ratio of the pointers and multiply one hundred by four and then by the two and a half indication of the range pointer before the meaning of the pointers is understood. Now, let us assume that the altitude of the Eremeeff instrument is 1,340 feet, the indication shown in Fig. 3 of the Kollsman altimeter (Tr. p. 64). For this altitude, if the Eremeeff device works as claimed for it, the pointer 47 should point to a little less than half way between the numerals 3 and 4 on his dial and the range pointer 48 should point to a position somewhere between the numerals 3 and 4 of the dial, that is a position about one-third of the distance from where it is now indicated in Fig. 2 of Eremeeff down to the position of the numeral 5. The exact place that it should point to is arrived at by solving the equation $1{,}340 \div 1{,}000 = X \div 2.5$ or $X = 2.5 \times 1.34 = 3.35$. This means on the dial thirty-five hundredths of the distance between the numbers 3 and 4. We leave it to any person whether an aviator needing an emergency reading would ever be able to calculate in time to save his life what his altitude was from the Eremeeff apparatus. The Patent Office urges that the many examples of water meters and cash registers which show two pointers driven by an almost unlimited amount of energy (the flow of water, the impulse of a finger and so forth), in one direction only, coupled with the failure of Eremeeff to show the Kollsman invention, total everything that Kollsman really invented. Eremeeff had before him all this non-analogous prior art relied upon by the Patent Office and he failed to make a readable altimeter. He even failed to make an altimeter indicating in any way a continuous flight over the usual altitude range (more than 4,000 ft.).

It may be interesting to note the different mechanical embodiment of Kollsman as against Eremeeff. Perhaps this is why Eremeeff could not combine a many rotation sensitive pointer with a 1 to 10 moving range pointer so that he could have a device that was actually workable and readable. Kollsman drove his sensitive pointer as one with the aneroid operated shaft (Fig. 1 Kollsman Tr. p. 62) and he geared down from that shaft through sun and planet gearing to his range pointer causing any inaccuracies to be limited to the range pointer where they did not matter. In any event, Kollsman made a great achievement. He gave to the aeroplane industry a sensitive altimeter reading through the entire flight range both for ascent and descent in two digits of the decimal system, namely in hundredths and thousandths of feet. Eremeeff gear-drove both his pointers from shaft 35.

Kollsman and his co-worker, Angst, have admitted that it took them two years of painstaking endeavor, working determinedly towards this end, before they accomplished their result. The witness Casey Jones, one of the best known pilots in America and one of the leading authorities on aeronautics, credits the Kollsman invention as making blind landing in a fog possible.

The unrefuted testimony is to the effect that the Kollsman altimeter, embodying the invention of the claims under appeal, has become standard throughout the United States, including the U. S. Army, the U. S. Navy, and the passenger air transport service of the United States. In addition to this, this instrument has become standard practically throughout the civilized world. Kollsman has sold tens of thousands of dollars worth of these instruments.

The art relied upon by the Commissioner of Patents, other than the patent to Eremeeff, is not analogous to the invention in issue. Cash registers, water meters, gas flow meters and the like, do not include the problem of indicating the variations in an external varying force such as atmospheric pressure. None of them function backwards as well as forwards. They teach nothing to the aeroplane instrument designer. We are willing to admit that it is naturally desirable to have instruments read in plural digits of the decimal system, but we urge and allege that it was not obvious that this could be done in a sensitive altimeter and we further urge that the one example relied upon by the Commissioner of Patents, the patent to Eremeeff, persuasively teaches us not only that Eremeeff did not do it, but that he probably knew he could not do it and that his adoption of his preferred 4 to 1 ratio was because of the recognized limitations in an instrument of this character relying upon the infinitesimal energy and almost microscopic movement of a bellows or aneroid as the yielding element responsive to a varying external force, such as atmospheric pressure.

We urge that Kollsman has achieved the seemingly impossible. Now his achievement seems simple. Its very simplicity acclaims the virtue and merit of his invention.

Courts Rightfully Sustain the Kollsman Type of Invention

A recent decision of this honorable Court, in connection with a simple invention where a material advance had been made in the art involved, is based upon facts on all fours with those at bar.

> *Otto* v. *Robertson,* 66 F. (2d) 213; 18 U. S. Pat. Q. 111.

In this case although it had been old practice to repeat through a follow-up motor and distant compass cards the gyrations of a master compass card and although mechanically operated and automatically selected numerals were also old, it was held to be invention to display a zero to the helmsman as long as he held the ship to its course and to cause this to change from zero to a definite numeral indicating the deviation as soon as he was off the course.

In this way perhaps seamen with a skill for steering and rather low mentality in the reading of angles were enabled to steer a ship when before they could not.

Although it is true that Kollsman's instrument is customarily read by pilots necessarily possessing high mentality but required to act quickly, Kollsman had a similar problem. His problem was to provide a dependable sensitive altimeter operative over a wide range so that it was readable at a glance without any calculation in thousands and hundredths of feet altitude. This Kollsman unquestionably has contributed to the aeroplane art. It is not only accepted by the aeroplane industry, but has been made standard. By being made standard we mean all that this expression can imply. It is standard by and for the United States Army and Navy.

Later Decisions Similar

This honorable Court has followed this same doctrine in connection with a vacuum cleaner with beaters where all the elements of the combination claimed were old in the art.

See:

Lucke v. *Coe*, 20 U. S. Pat. Q. 178, Decided Feb. 5, 1934.

The same general doctrine emphasizing the effect of great utility and success was again set forth by this honorable Court on March 25, 1935.

See:

Wach v. *Coe*, 25 U. S. Pat. Q. 25.

The Sustaining of An Invention Such As that of Kollsman Has the Approval of the Supreme Court of the United States

Potts v. *Craeger,* 155 U. S. 597, 607, 608; 15 Sup. Ct. 194; 39 L. Ed. 275.

"Upon the other hand, we have recently upheld a patent to one who took a torsional spring, such as had been previously used in clocks, doors and other articles of domestic furniture, and applied it to telegraph instruments, the application being shown to be wholly new. Western Electric Co. *v.* La Rue, 139 U. S. 801. So, also, in Crane *v.* Price, Webster's Pat. Cas. 409, the use of anthracite coal in smelting iron ore was held to be a good invention, inasmuch as it produced a better article of iron at a less expense, although bituminous coal had been previously used for the same purpose. See also Steiner *v.* Neald, 6 Exch. 607.

"*Indeed, it often requires as acute a perception of the relation between cause and effect, and as much of the peculiar intuitive genius which is a characteristic of great inventors, to grasp the idea that a device used in one art may be made available in another, as would be necessary to create the device de novo. And this is not the less true if, after the thing has been done, it appears to the ordinary mind so simple as to excite wonder that it was not thought of before. The apparent simplicity of a new device often leads an inexperienced person to think that it would have occurred to any one familiar with the subject; but the decisive answer is that with dozens and perhaps hundreds of others laboring in the same field, it had never occurred to any one before. The practised eye of an ordinary mechanic may be safely trusted to see what ought to be apparent to every one.* As

> was said by Mr. Justice Bradley, in Loom Company *v.* Higgins, 105 U. S. 580, 591; 'Now that it has succeeded, it may seem very plain to anyone that he could have done it as well. This is often the case with inventions of the greatest merit. It may be laid down as a general rule, though perhaps not an invariable one, that if a new combination and arrangement of known elements produce a new and beneficial result ever attained before, it is evidence of invention.' " (Italics inserted.)

Clear Cut Issue

Claims 3 and 4 are among the claims rejected by the Board of Appeals, which rejection was sustained by Justice Bailey. As to these two claims the operation of the 10 to 1 rotating pointers was defined by "means for rotating said pointers in the said one to ten ratio in response to something to be measured". We believe that this language does not satisfactorily distinguish from a water meter, the flow of water which operates on means for rotating the pointers and we believe this despite the fact that the caption to each of these claims is "an aeroplane measuring instrument" and the water meters obviously are not in the aeroplane measuring instrument art. We believe, however, that the claims under appeal, 1, 2, 5 and 6, which specify definitely the interconnection between the yielding element and both the pointers in an aircraft measuring instrument operated by an external varying force, each recite a mechanism which operates to accomplish the Kollsman objective and we believe that enough of this mechanism is recited in the claim to warrant protection by patent. The precise mechanism is definitely illustrated and described in the specification. Kollsman is a pioneer in imparting to sensitive altimeters this instantaneous 10 to 1 decimal system reading and should have protection thereon as a successful pioneer.

Conclusion

The only aeroplane instrument relied upon by the Patent Office failed to indicate with its pointers in two digits of the decimal system. All the other art aggregated against Kollsman is non-analogous and shows mechanisms none of which could be imported into an altimeter. The Kollsman instrument is very successful. It has been made standard by the United States Army and Navy and has gone into extensive use. It is credited with making an epochal advance in flying (blind landings made possible).

The simplicity of the Kollsman invention is part of its merit and enhances its patentability.

The prayer of the appellant should be granted. The decree below as to the claims appealed should be reversed directing the Commissioner of Patents to allow claims 1, 2, 5, 6 and 7 to the appellant.

Respectfully submitted,

LEONARD DAY,
Solicitor for Appellant Kollsman.

UNITED STATES
COURT OF APPEALS OF THE
DISTRICT OF COLUMBIA
FILED NOV 4 - 1936

CLERK

No. 6784

In the United States Court of Appeals for the District of Columbia

PAUL KOLLSMAN, APPELLANT
v.
CONWAY P. COE, COMMISSIONER OF PATENTS,
APPELLEE

APPEAL FROM THE SUPREME COURT OF THE DISTRICT OF COLUMBIA (NOW DISTRICT COURT OF THE UNITED STATES FOR THE DISTRICT OF COLUMBIA)

BRIEF FOR THE COMMISSIONER OF PATENTS

R. F. WHITEHEAD,
Solicitor, United States Patent Office.

W. W. COCHRAN,
Law Examiner, Patent Office,
Of Counsel.

In the United States Court of Appeals for the District of Columbia

October Term, 1936

No. 6784

Paul Kollsman, appellant
v.
Conway P. Coe, Commissioner of Patents,
appellee

APPEAL FROM THE SUPREME COURT OF THE DISTRICT OF COLUMBIA (NOW DISTRICT COURT OF THE UNITED STATES FOR THE DISTRICT OF COLUMBIA)

BRIEF FOR THE COMMISSIONER OF PATENTS

This case comes before the court on appeal from the decree of the Supreme Court of the District of Columbia (now the District Court of the United States for the District of Columbia), holding appellant not entitled to a patent including claims 1 to 6 of his application, No. 705642, filed January 8, 1934, entitled "Quick Reading Indicator", and dismissing as to such claims appellant's bill brought under the provisions of Section 4915 R. S., to authorize the Commissioner of Patents to issue appellant a patent.

The appeal is taken only as to claims 1, 2, 5, and 6 of the application. These claims are found on pages 3 and 4 of appellant's brief and also on pages 44 and 45 of the printed record. The application here involved is for the reissue of appellant's patent No. 1857311, issued May 10, 1932.

The application discloses an altimeter for use on aircraft. The altimeter embodies a dial graduated in the decimal system and two pointers, one relatively long and the other relatively short, cooperating with the dial to indicate the altitude of the aircraft. The pointers are connected to each other by gearing in such manner that the longer pointer will move at ten times the rate of the shorter pointer, just as the minute hand of the clock moves at twelve times the rate of the hour hand. In appellant's instrument the shorter hand indicates thousands of feet and the longer hand indicates hundreds of feet. The pointers are operatively connected to a yielding element in such manner that the variations in a force impressed on the yielding element are indicated by a movement of the pointers. In the specific embodiment disclosed by appellant the yielding element is an aneroid capsule and the pointers indicate the altitude of the craft upon which the instrument is mounted. The claims on appeal, however, are not limited to this embodiment.

The instrument possesses many other features of construction than those just mentioned. For example, mechanism is provided for manually rotating the pointers relative to each other and to the dial so that the pointers may be made to read zero for any barometric reading or any elevation above sea level. Thus the pilot of the craft, knowing the barometer pressure at any particular landing field, may while traveling toward that field, set the instrument to show his elevation above that field. This setting of the instrument is accomplished by simple manipulation of the knob 53 shown in appellant's drawings. By an alternative manipulation of the same knob the dial of the instrument may be moved relative to the casing thereof and the pointers simultaneously moved relatively to each other and to the dial to cause the pointers to indicate zero at the elevation of any landing field. By further features of construction the manipulations just mentioned are prevented from causing any strain on the delicate aneroid element.

Appellant produced testimony before the lower court to the effect that his instrument had met with great commercial success, has become standard equipment for airplanes in the United States, and has made blind landing in a fog possible. Appellant's witness, Jones, however, testified (R., p. 25) that:

> When an aircraft is descending to a field having an elevation for which the altimeter is set to read zero, and the altimeter has two pointers, one indicating thousands of feet

> and the other indicating hundreds of feet, the pilot, when the craft is less than 1,000 feet above the ground, directs his attention only to the latter pointer. Both pointers will approach zero as the craft nears the ground, regardless of the relative rate of motion between the pointers.

This testimony would indicate that at the critical time when an airplane is approaching a landing the ratio of movement of the pointers is unimportant, for whatever that ratio is, both pointers are then approaching a zero reading and the pilot directs his attention only to the longer pointer. It follows therefore that the success which appellant's instrument has attained in making blind landing possible should be ascribed to other features of his instrument than the 10 to 1 ratio of movement of the pointers.

That such other features of the instrument, namely those set forth in the third preceding paragraph, are ingenious and of great merit is not denied by appellee. In fact the Patent Office has granted apellant a patent with claims reciting such features.

In appellant's application here under consideration he seeks to have that patent reissued to include the very broad claims on appeal, which claims recite none of the features just alluded to and are not even limited to an altimeter. The presence of such features in appellant's altimeter is therefore wholly immaterial to the issue before this court.

Claims 1 and 2 on appeal recite in essence no more than an aircraft instrument comprising a yielding element operatively connected with pointers to move over a dial in response to a force acting on the yieldable element, the dial being graduated in the decimal system and the pointers being intergeared to move in the ratio of 10 to 1. Claims 5 and 6 add to the subject matter of claims 1 and 2 the limitation that the instrument is enclosed in a casing, and claim 6 further recites that one of the pointers is counterweighted.

The appealed claims were held unpatentable by the tribunals of the Patent Office and by the court below in view of the prior patent to Eremeeff taken in conjunction with other patents to be mentioned later.

EREMEEFF PATENT

The Eremeeff patent (R. pp. 69–73) discloses a barometric device which is described as intended for use on an aircraft or motor vehicle to indicate small differences in altitude. The device comprises a yieldable element 27 which expands and collapses to varying degrees in response to variations in the atmospheric pressure to which its exterior surface is exposed. The yielding element is operatively connected to pointers 47 and 48, moving over a dial 51, which is graduated in the decimal system. The long pointer 47, which indicates hundreds of feet, moves at four times the rate of the short pointer 48, which indicates thousands of feet, whereas the ratio of movement of appellant's similar pointers is 10 to 1.

Even if there were no prior art teaching this simple modification of the Eremeeff disclosure, it is doubtful that such modification would amount to invention. Appellant's own witness, Angst, testified as follows (R. p. 24):

> I don't claim that with pointers geared like those in the Eremeeff patent it required more than mechanical skill to make the pointers relatively move 10 to 1 to each other.

The prior art, however, is replete with instances of the use in many types of instruments of dials graduated in the decimal system with pointers intergeared to move in the ratio of 10 to 1. Appellee has cited three such instances in the United States patent to Munnell, No. 309240, December 16, 1884 (R. pp. 74–76), the French patent to Zang et Cie, No. 557424, August 8, 1923 (R. pp. 81–86), and the Swiss patent to Compagnie Pour la Fabrication des Compteurs et Matériel d'Usines a Gaz, No. 51663, April 6, 1910 (R. pp. 87–94). Also appellant has called attention to a number of other instances occurring in patents, comprising his physical exhibits 11 and 12 (R. pp. 19–21).

In view of the testimony of the witness Angst and the teaching of the prior art, it is submitted that no invention was required to modify the Eremeeff structure to make the pointer 48 move at one-tenth the rate of the pointer 47. Thus modified the Eremeeff structure meets appealed claims 1 and 2.

Claims 5 and 6 recite in addition to the subject matter of claims 1 and 2, that the instrument is enclosed in a casing. Appellee contends that this feature is of no patentable merit in view of the common practice of enclosing instruments in casings and the court below so held. On a very similar question which arose some years ago in the Patent Office the Commissioner held, and it is submitted properly, that:

> "Everybody knows that if a mechanism gets dusty when exposed to dust or if one does not want people to tamper with it the ordinary thing to do is to inclose it in a frame, and if one wishes to see what is going on inside the casing the natural thing to do is to supply a glass window, and no invention is involved in either the idea or the mechanism." *Ex parte Onderdonk,* 260 O. G. 561, 1919 C. D. 24.

Claim 6 adds the further limitation that one of the pointers is counterweighted. Counterweights are shown at 43′ and 44′ in appellant's drawings. It is submitted that this feature involves no invention since it also is a common expedient and is shown for example in Fig. 5 of the Eremeeff patent (R. p. 70) and also in Fig. 1 of the patent to Rasch (French) No. 475931, April 6, 1915 (R. p. 77).

Appellant in his brief dwells at length on certain specific differences between his own construction and that of Eremeeff, as for example, the differences between the yieldable elements employed and the differences between the means which connect the yielding elements to the pointers. These differences are not denied by appellee but are thought to be wholly immaterial to the question of the patentability of the claims here in issue since they are not recited therein.

Concerning the cases cited by appellant it is submitted that the rejection of the claims by the Patent Office and the concurring decision of the lower court are not in conflict with the rulings made in such cases. In those cases invention was found, but here it is submitted that invention is absent, for appellant, in modifying the Eremeeff device, has done no more than was clearly taught by the prior art. Appellee submits that it is never invention to do merely what the prior art teaches.

This proposition finds support in the decision of the Supreme Court of the United States in the recent case of *Altoona Publix Theatres, Inc.* v. *American Tri-Ergon Corporation and Tri-Ergon Holding, A. G.,* 452 O. G. 705; 294 U. S. 477.

In holding that the use of a flywheel in a certain apparatus did not amount to invention, the court said:

> An improvement to an apparatus or method to be patentable, must be the result of invention, and not the mere exercise of the skill of the calling or an advance plainly indicated by the prior art. * * * The inclusion of a flywheel in any form of mech-

> anism to secure uniformity of its motion has so long been standard procedure in the field of mechanics and machine design that the use of it in the manner claimed by the present patent involved no more than the skill of the calling. * * * However skillfully this was done, and even though there was produced a machine of greater precision and a higher degree of motion-constancy, and hence one more useful in the art, it was still the product of skill, not of invention.

Paraphrasing the court's language, appellee's position is that the use of pointers moving at the ratio of 10 to 1 in connection with a dial graduated in the decimal system in any form of indicator to facilitate quick reading thereof has so long been standard procedure in the field of indicator design that the use of it in the manner claimed by appellant involved no more than the skill of the calling.

It is submitted that the decree of the lower court dismissing the Bill as to the claims here on appeal should be affirmed with costs against the appellant.

R. F. WHITEHEAD,
Solicitor, United States Patent Office.

W. W. COCHRAN,
Law Examiner, Patent Office,
Of Counsel.

OCTOBER 1936.

U. S. GOVERNMENT PRINTING OFFICE: 1936